Peplink Balance Series
User Manual

Peplink Balance
20L/30/200/300/380/390/700/710
Firmware version 4.5.1

Oct 2008

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1 Introduction and Scope

The Peplink Balance series provides link aggregation and load balancing across up to seven WAN connections.

The Peplink Balance 20L provides a cost-effective solution suitable for home environment.

The Peplink Balance 30 provides a feature set that is suitable for Small Office / Home Office (SO/HO) environments.

The Peplink Balance 200/300 provides advanced features for small business.

The Peplink Balance 380, 390, 700 and 710, with a suite of advanced enterprise-class features, make ideal single-box solutions for medium to large-sized businesses environments, and allow service providers to enable highly available multi-network service.

This manual applies to the following Peplink Balance products with **firmware v4.5**:

- Peplink Balance 20L
- Peplink Balance 30
- Peplink Balance 200/300
- Peplink Balance 380/390
- Peplink Balance 700/710

The manual presents how to set up Peplink Balance, and provides a collection of case studies involving advanced features of Peplink Balance.

2 Glossary

The following terms, acronyms, and abbreviations are frequently used in this manual:

Term	Definition
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
GRE	Generic Routing Encapsulation
HTTP	Hyper-Text Transfer Protocol
ICMP	Internet Control Message Protocol
IP	Internet Protocol
LAN	Local Area Network
MAC Address	Media Access Control Address
MTU	Maximum Transmission Unit
MSS	Maximum Segment Size
NAT	Network Address Translation
PPPoE	Point to Point Protocol over Ethernet
SNMP	Simple Network Management Protocol
TCP	Transmission Control Protocol
UDP	User Datagram Protocol

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VRRP	Virtual Router Redundancy Protocol
WAN	Wide Area Network

3 Product Features

Peplink Balance Series products enable all LAN users to share broadband Internet connections, and provide advanced features to enhance Internet access. The following is the list of supported features:

3.1 Supported Network Features

3.1.1 WAN

- Multiple public IP support (DHCP, PPPoE, Static IP Address, or GRE)
- 10/100/1000 Mbps Connection in Full/Half Duplex
- Drop-in Mode **(available only with Peplink Balance 30, 200, 300, 380, 390, 700 and 710)**
- Network Address Translation (NAT) / Port Address Translation (PAT)
- Inbound and Outbound NAT mapping
- IPsec NAT-T and PPTP packet pass through
- Multiple static IP addresses per WAN Connection
- MAC address clone
- Customizable MTU and MSS values
- WAN connection health check
- Dynamic DNS (Supported service providers: changeip.com, dyndns.org, no-ip.org and tzo.com)

3.1.2 LAN

- DHCP server on LAN
- Static routing rules
- Local DNS

3.1.3 Site-to-Site VPN

- Secure yet easy to setup site-to-site VPN **(available only with Peplink Balance 380, 390, 700 and 710)**

3.1.4 Firewall

- Outbound (LAN to WAN) firewall rules
- Inbound (WAN to LAN) firewall rules per WAN connection
- Intrusion detection and prevention
- Specification of NAT mappings

3.1.5 Inbound Traffic Management

- TCP/UDP traffic redirection to dedicated LAN server(s)
- Inbound link load balancing by means of DNS **(available only with Peplink Balance 200, 300, 380, 390, 700 and 710)**

3.1.6 Outbound Traffic Management

- Link load distribution per TCP/UDP service

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- Persistent routing for specified source and/or destination IP addresses per TCP/UDP service
- Traffic Prioritization and DSL/Cable optimization

3.2 Other Supported Features

- Easy-to-use web-based administration interface
- HTTP and HTTPS support for Web Administration Interface
- Configurable web administration port and administrator password
- Firmware upgrades, configuration backups, Ping, and Traceroute via Web Administration Interface
- Remote web based configuration (via WAN and LAN interfaces)
- Remote reporting to Peplink Balance reporting server
- Hardware High Availability via VRRP **(available only with Peplink Balance 200, 300, 380, 390, 700 and 710)**
- Quality of Service for Voice over IP and Secure Web **(available only with Peplink Balance 200, 300, 380, 390, 700 and 710)**
- Time server synchronization
- SNMP
- Email notification
- Syslog
- SIP pass through
- PPTP packet pass through
- Web Logging
- Link Status (Active Sessions)

4 Package Contents

The contents of Peplink Balance product packages are as follows:

4.1 Peplink Balance 20L / 30 / 200 / 300

- Peplink Balance 20L/30/200/300
- Power adapter
- Information slip
- CD containing this user manual

4.2 Peplink Balance 380 / 390 / 700 / 710

- Peplink Balance 380/390/700/710
- Power cord
- Information slip
- CD containing this user manual
- Rack mount kit

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5 Peplink Balance Overview

5.1 Peplink Balance 20L / 200

5.1.1 Front Panel Appearance

5.1.2 LED Indicators

The statuses indicated by the Front Panel LEDs are as follows:

Power and Status Indicators	
Power	OFF – Power off Green – Power on
Status	OFF – System initializing Red – Booting up or busy Orange – Power on self test Green – Ready

LAN Indicators	
Activity	OFF – Port is not connected Green – Port is connected Blinking – Port is transferring data
10/100	OFF – 10Mbps Orange – 100Mbps

WAN Indicators	
Activity	OFF – Port is not connected Green – Port is connected Blinking – Port is transferring data
10/100	OFF – 10Mbps Orange – 100Mbps

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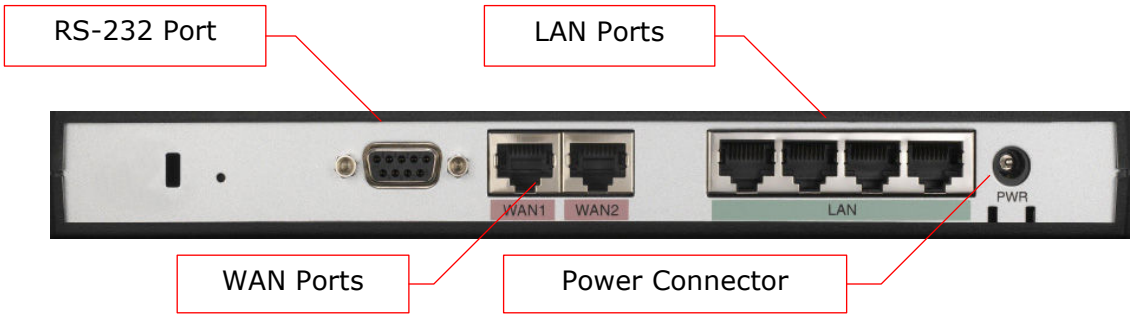
5.1.3 Rear Panel Appearance

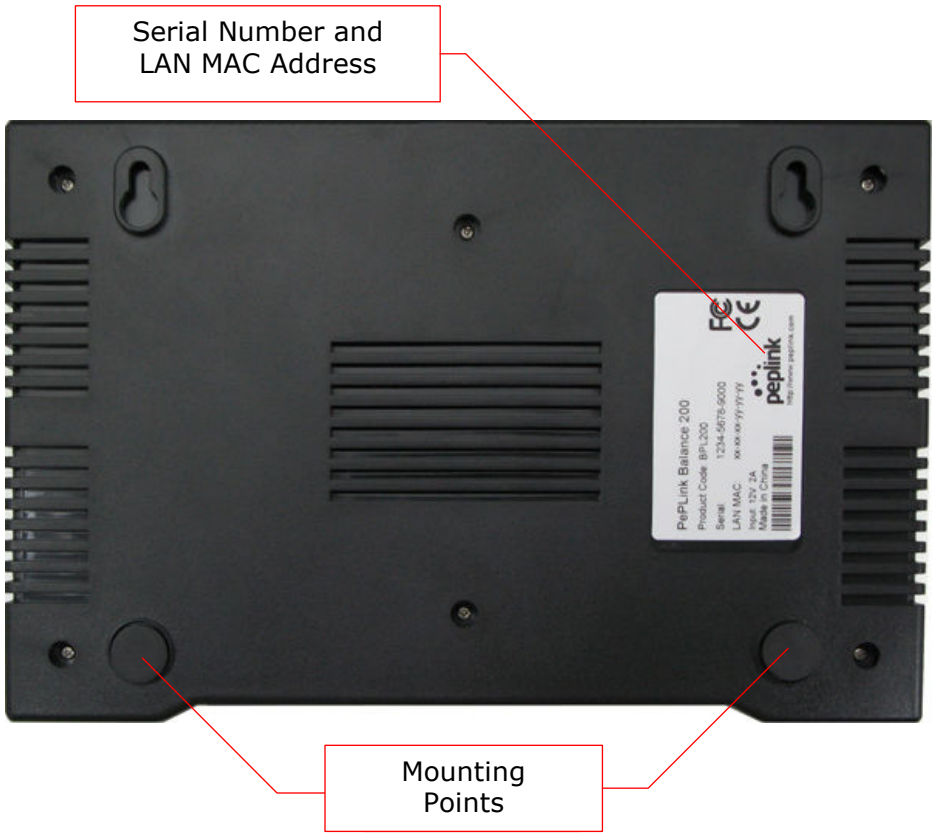


5.1.4 Connector Ports

The connector ports on the rear panel are as follows:

Connector Ports	
RS-232 Port	Reserved for engineering use
WAN Ports	Supports up to two 10/100BaseT WAN connections, typically connected to broadband modems
LAN Ports	Supports up to four 10/100BaseT LAN connections, typically connected to client PCs
Power Connector	DC 9V power input from supplied power adaptor

5.1.5 Unit Base Appearance



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5.2 Peplink Balance 30 / 300

5.2.1 Front Panel Appearance

5.2.2 LED Indicators

The statuses indicated by the Front Panel LEDs are as follows:

Power and Status Indicators	
Power	OFF – Power off Green – Power on
Status	OFF – System initializing Red – Booting up or busy Orange – Power on self test Green – Ready state

LAN Indicators	
Activity	OFF – Port is not connected Green – Port is connected Blinking – Port is transferring data
10/100	OFF – 10Mbps Orange – 100Mbps

WAN Indicators	
Activity	OFF – Port is not connected Green – Port is connected Blinking – Port is transferring data
10/100	OFF – 10Mbps Orange – 100Mbps

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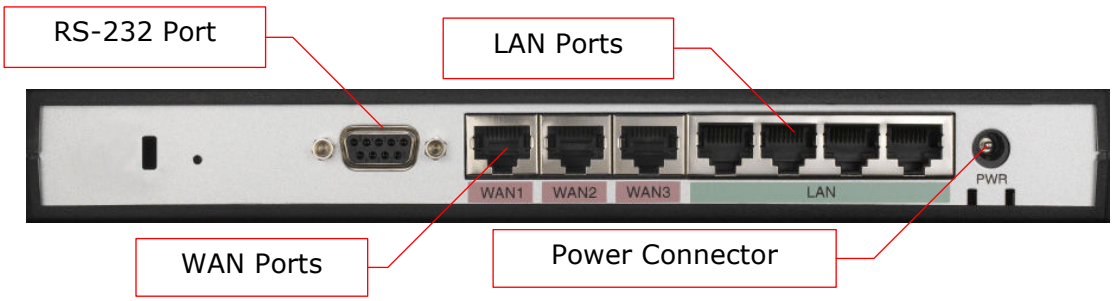
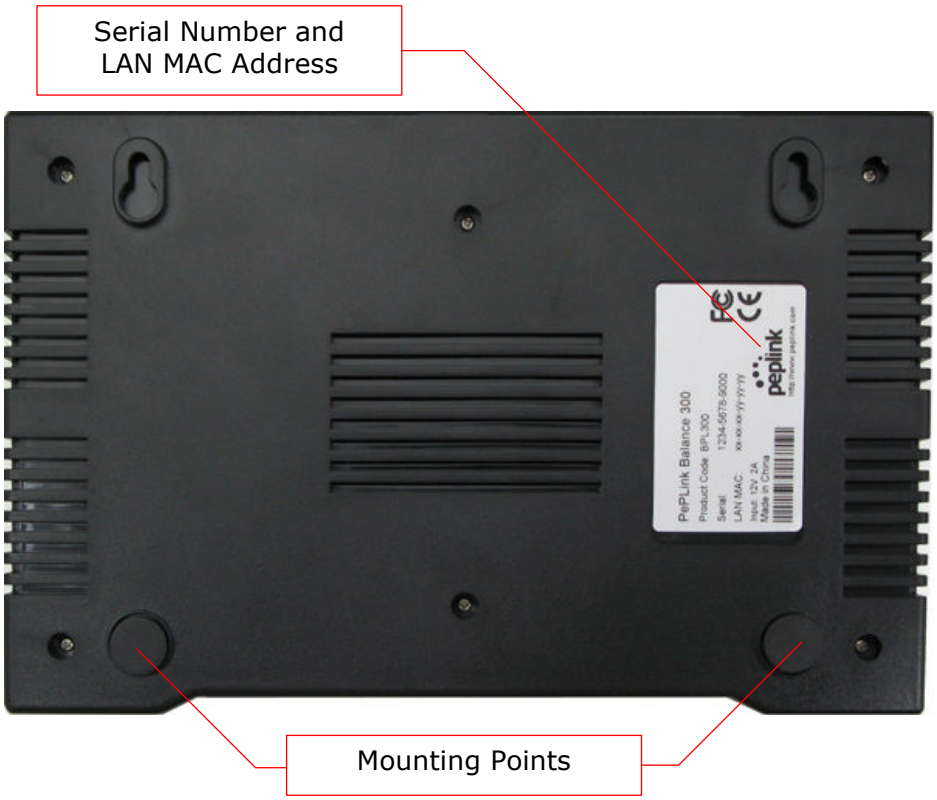
5.2.3 Rear Panel Appearance



5.2.4 Connector Ports

Connector Ports	
RS-232 Port	Reserved for engineering use
WAN Ports	Supports up to three 10/100BaseT WAN connections, typically connected to broadband modems
LAN Ports	Supports up to four 10/100BaseT LAN connections, typically connected to client PCs
Power Connector	DC 9V power input from supplied power adaptor

5.2.5 Unit Base Appearance



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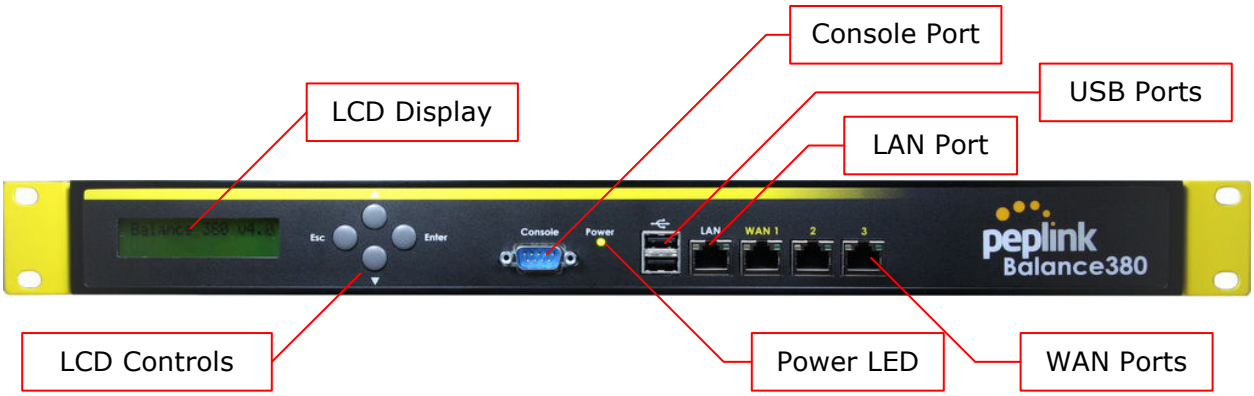
5.3 Peplink Balance 380/390

5.3.1 Front Panel Appearance



5.3.2 LED Indicators

The statuses indicated by the Front Panel LEDs are as follows:

Power and Status Indicators	
Power LED	OFF – Power off Green – Power on

Console and USB Ports	
Console Port	Reserved for Engineering Use
USB Port	Reserved for Engineering Use

LAN and WAN Ports (Balance 380)	
Green LED	ON – 100 Mbps OFF – 10 Mbps
Yellow LED	Solid – Port is connected without traffic Blinking – Data is transferring OFF – Port is not connected
Note:	They are MDI ports

LAN Port and WAN Ports (Gigabit ports on Balance 390)	
Green LED	ON – 1000 Mbps OFF – 100/10 Mbps
Yellow LED	Solid – Port is connected without traffic Blinking – Data is transferring OFF – Port is not connected
Note:	They are auto MDI/MDI-X ports

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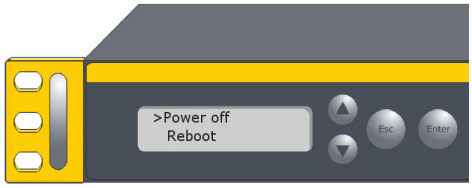
5.3.3 LCD Display Menu



> System Status
- > System
  - > Firmware ver (shows firmware version)
  - > Serial number (shows serial number)
  - > System time (shows current time)
  - > System up time (shows up time since server reboot)
  - > CPU load (shows current CPU loading, 0-100%)
  - > LAN
    - > Status (shows LAN port physical status)
    - > IP address (shows LAN IP address)
    - > Subnet mask (shows LAN subnet mask)
- > Link status (shows Connected/Disconnected, IP address list)
  - > WAN1
  - > WAN2
  - > WAN3
- > Link usage
  - > Throughput in (shows transfer rate in Kbps)
    - > WAN1
    - > WAN2
    - > WAN3
  - > Throughput out (shows transfer rate in Kbps)
  - > WAN1
  - > WAN2
  - > WAN3
- > Data Transfer'd (shows volume transferred since last reboot in MB)
  - > WAN1
  - > WAN2
  - > WAN3

> Maintenance
- > Power off > Power off? (Yes/No) (powers off unit)
- > Reboot > Reboot? (Yes/No) (reboots unit)
- > Factory default > Factory default? (Yes/No) (restores factory defaults)

> LAN config
- > Port speed (shows port speed: Auto, 10baseT-FD, 10baseT-HD, 100baseTx-FD, 100baseTx-HD)
  - > LAN
  - > WAN1
  - > WAN2
  - > WAN3

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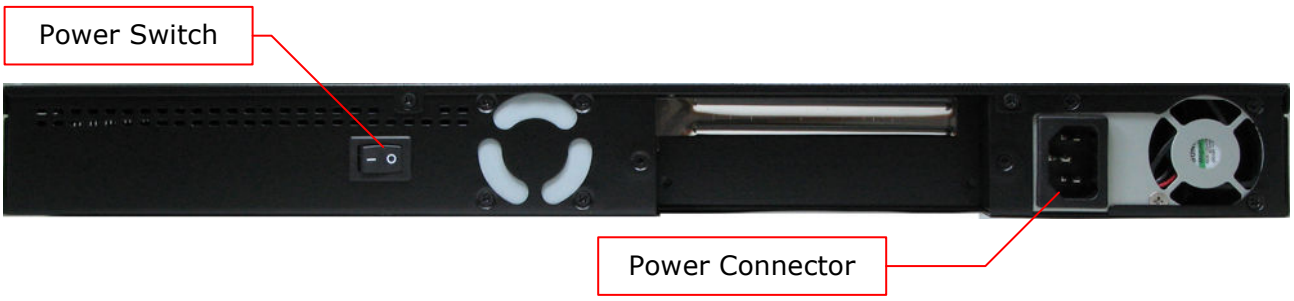
5.3.4 Rear Panel Appearance



Connector Ports	
Power Connector	AC input 110/220V

Switch	
Power Switch	- To hold pressing the key for 4 secs will power down the unit - When the unit is powered off, press it will power on the unit

5.3.5 Unit Label Appearance

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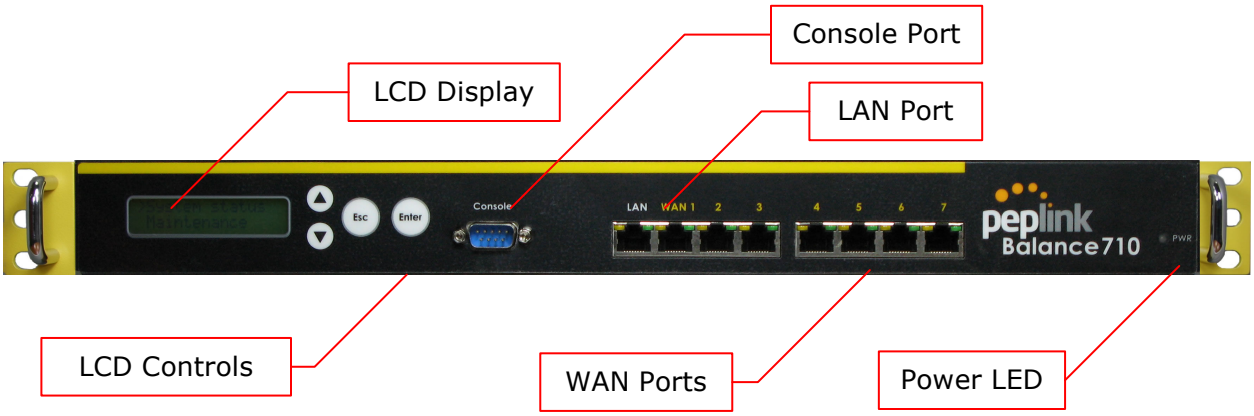
5.4 Peplink Balance 700 / 710

5.4.1 Front Panel Appearance



Status indicated in the Front Panel is as follows:

LED Indicator	
Power LED	OFF – Power off ON (Green) – Power on

Console Port	
Console Port	Reserved for Engineering Use

LAN Port and WAN Ports 1 to 3 (Gigabit Ethernet)	
Green LED	ON – 1000 Mbps OFF – 100/10 Mbps
Yellow LED	Solid – Port is connected without traffic Blinking – Data is transferring OFF – Port is not connected
Note:	They are auto MDI/MDI-X ports

WAN Ports 4 to 7 (Fast Ethernet)	
Green LED	ON – 100 Mbps OFF – 10 Mbps
Yellow LED	Solid – Port is connected without traffic Blinking – Data is transferring OFF – Port is not connected
Note:	They are MDI ports

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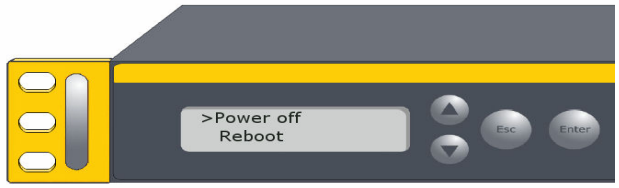
5.4.2 LCD Display Menu



> System Status
    > System
        > Firmware ver (shows firmware version)
        > Serial number (shows serial number)
        > System time (shows current time)
        > System up time (shows up time since server reboot)
        > CPU load (shows current CPU loading, 0-100%)
        > LAN
            > Status (shows LAN port physical status)
            > IP address (shows LAN IP address)
            > Subnet mask (shows LAN subnet mask)
    > Link status (shows Connected/Disconnected, IP address list)
        > WAN1
        > WAN2
        > …
        > WAN7
    > Link usage
        > Throughput in (shows transfer rate in Kbps)
            > WAN1
            > WAN2
            > …
            > WAN7
        > Throughput out (shows transfer rate in Kbps)
        > WAN1
        > WAN2
        > …
        > WAN7
    > Data Transfer'd (shows volume transferred since last reboot in MB)
        > WAN1
        > WAN2
        > …
        > WAN7
> Maintenance
    > Power off > Power off? (Yes/No) (powers off unit)
    > Reboot > Reboot? (Yes/No) (reboots unit)
    > Factory default > Factory default? (Yes/No) (restores factory defaults)
> LAN config
    > Port speed (shows port speed: Auto, 10baseT-FD,
        > LAN 10baseT-HD, 100baseTx-FD,
        > WAN1 100baseTx-HD, 1000baseTx-FD)
        > WAN2
        > …
        > WAN7

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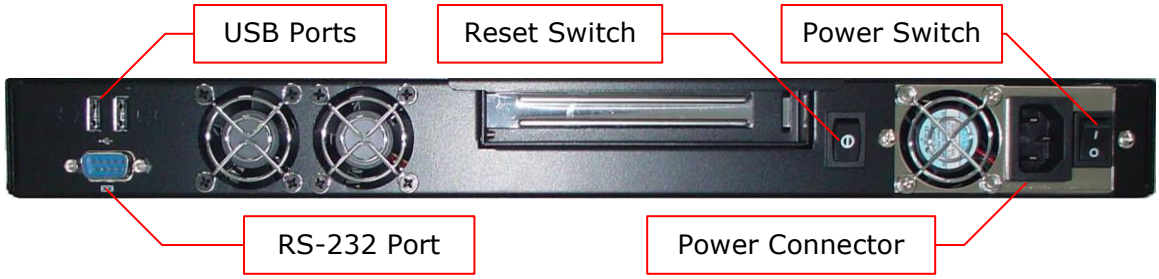
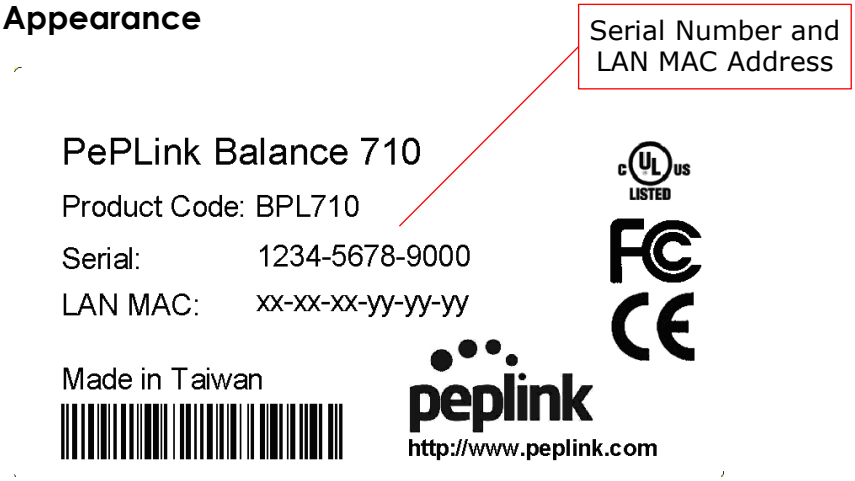
5.4.3 Rear Panel Appearance



Connector Ports	
RS-232 Port	Reserved for engineering use
USB Ports	Reserved for engineering use
Power Connector	AC input 110/220V

Switches	
Power Switch	- To hold pressing the key for 4 secs will power down the unit - When the unit is powered off, press it will power on the unit
Reset Switch	Press and release once to reset the system

5.4.4 Unit Label Appearance



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6 Installation

6.1 Connecting the Network with Peplink Balance

6.1.1 Preparation

Before installing Peplink Balance, please prepare the following:

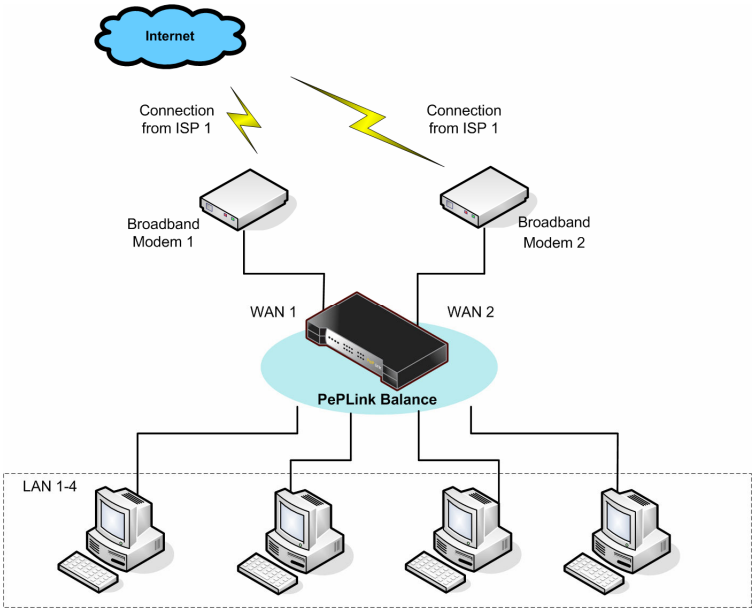
- At least one Internet/WAN access account
- For each network connection, one 10/100BaseT UTP cable with RJ45 connectors, or one 1000BaseT Cat5E UTP cable for the Gigabit ports on the Balance 700/710.
- A computer with TCP/IP network protocol and a web browser installed. Supported browsers include Microsoft Internet Explorer 6 or above, Mozilla Firefox 2.0 or above or Apple Safari 3.1.1 or above.

6.1.2 Constructing the Network

At a high level, construct the network according to the following steps:

1. With a network cable, connect a computer to one of the LAN ports on the Peplink Balance. For Peplink Balance 20L, 30, 200, and 300, repeat with different cables for up to 4 computers to be connected.
2. With another network cable, connect the WAN/broadband modem and one of the WAN ports on the Peplink Balance. Repeat using different cables to connect up to 2, 3 or 7 WAN/broadband connections with the Peplink Balance 200, 300/380/390, and 700/710, respectively.
3. For Peplink Balance 20L, 30, 200 and 300, connect the provided power adapter to the power connector, and then plug in the power adapter at a power outlet. For Peplink Balance 380, 390, 700 and 710, connect the provided power cord to the AC power port, and then plug in the cord at a power outlet.

The following figure schematically illustrates the configuration that results:



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6.1.3 Configuring the Network Environment

To ensure that Peplink Balance works properly in the LAN environment, and can access the Internet via the WAN connections, please refer to the following setup procedures:

- PC Configuration on the LAN

  Section 6.2, **Configuring Computers on the LAN**

- LAN Configuration

  For basic configuration, please refer to Section 7, **Basic Configuration**.

  Section 8, **Configuration of LAN Interface(s)** covers advanced configuration.

- WAN Configuration

  For basic configuration, refer to Section 7, **Basic Configuration**.

  Section 10, **Configuration of WAN Interface(s)** covers advanced configuration.

6.2 Configuring Computers on the LAN

The simplest way to setup the Local Area Network (LAN) is to enable the DHCP Server functionality of Peplink Balance. With this setting, Peplink Balance will automatically provide a suitable IP Address (and related information) to each computer connected to its LAN interface. (Please refer to Section 8, **Configuration of LAN Interface(s)**, for further details on the DHCP Server Settings.)

The following steps configure a computer on the LAN to use the DHCP Server functionality provided by Peplink Balance:

6.2.1 Windows 95/98/ME/2000 DHCP Client Configuration

4. Select ***Start Menu > Settings > Control Panel > Internet Options***.
5. Select the ***Connection*** tab, and click the ***Setup*** button.
6. Select the option:

   I want to set up my Internet connection manually, or I want to connect through a local area network (LAN)

7. Click ***Next***.
8. Select the option:

   I connect through a local area network (LAN)

9. Click ***Next***.
10. On the subsequent Local area network Internet Configuration screen, ensure that all of the boxes are **unchecked**.
11. When prompted with the following:

    Do you want to set up an Internet mail account now?

    Select the option ***No***.

12. Click ***Finish*** to close the Internet Connection Wizard.

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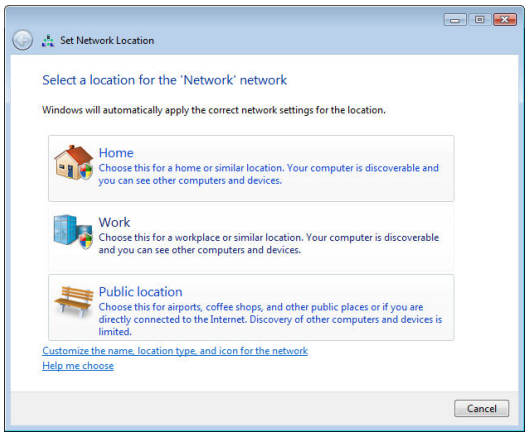
6.2.2 Windows XP DHCP Client Configuration

1. Select ***Start Menu > Control Panel > Network and Internet Connections***.
2. Select ***Set up or change your Internet Connection***.
3. Select the ***Connection*** tab, and click the ***Setup*** button.
4. At the ***Location Information*** pop-up menu, select ***Cancel***.
5. At the ***New Connection Wizard*** screen, click ***Next***.
6. Select ***Connect to the Internet*** and click ***Next***.
7. Select ***Set up my connection manually*** and click ***Next***.
8. Select the following checkbox:

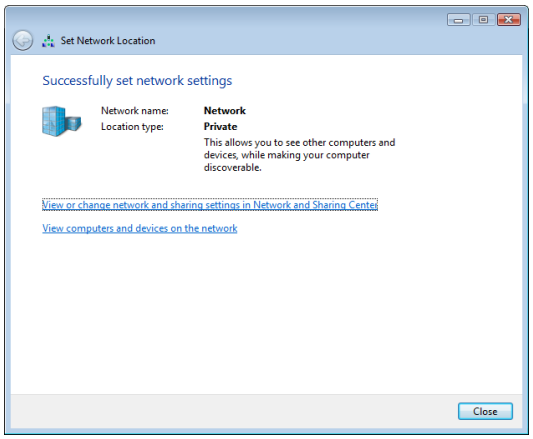
   Connect using a broadband connection that is always on
9. Click ***Next***.
10. Click ***Finish*** to close the New Connection Wizard.

6.2.3 Windows Vista DHCP Client Configuration

1. Connect the computer and the Peplink Balance's LAN interface with an Ethernet cable.
2. The following screen will be displayed on the computer screen. Choose "**Work**".


Set Network Location
Select a location for the 'Network' network
Windows will automatically apply the correct network settings for the location.
Home
Choose this for a home or similar location. Your computer is discoverable and you can see other computers and devices.
Work
Choose this for a workplace or similar location. Your computer is discoverable and you can see other computers and devices.
Public location
Choose this for airports, coffee shops, and other public places or if you are directly connected to the Internet. Discovery of other computers and devices is limited.
Customize the name, location type, and icon for the network
Help me choose
Cancel

3. Click "**Close**" to finish.


Set Network Location
Successfully set network settings
Network name: Network
Location type: Private
This allows you to see other computers and devices, while making your computer discoverable.
View or change network and sharing settings in Network and Sharing Center
View computers and devices on the network
Close

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6.2.4 Mac DHCP Client Configuration

1. Open TCP/IP Control Panel.
2. From the ***Connect via*** pop-up menu, select ***Ethernet***.
3. Select ***Using DHCP Server*** from the ***Configure*** pop-up menu.
   (The ***DHCP Client ID*** field can be left blank.)
4. Save the settings and close the TCP/IP Control Panel.

6.2.5 UNIX DHCP Client Configuration

Depending on the flavor of UNIX, the procedure may vary. The following steps are for Red Hat Enterprise Linux 3:

1. Login to the system as ***root***.
2. At the command prompt, type `netconfig`.
3. When prompted with the following:

   Would you like to set up networking?

   Respond with ***Yes***.
4. When prompted with the following:

   Please enter the IP configuration for this machine...

   Select the option:

   Use dynamic IP configuration (BOOTP/DHCP)
5. Select ***OK***.

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7 Basic Configuration

7.1 Connecting to Web Administration Interface

1. Start a web browser on a computer connected through LAN with Peplink Balance.
2. To connect to Web Administration Interface of Peplink Balance, enter the following LAN IP address in the address field of the web browser:

   `http://192.168.1.1`

   (The default LAN IP address for Peplink Balance is 192.168.1.1)
3. When prompted for ***User Name*** and ***Password*** to access the Web Administration Interface, enter the following as ***User Name*** and ***Password*** to proceed.

   User Name: admin

   Password: admin

   (The default admin password can be changed at the page ***System > Admin Security*** of the Web Administration Interface.)
4. After successful login, the main page of Web Administration Interface is displayed:

Important Note
Configuration changes (e.g. WAN, LAN, Admin settings, etc.) take effect after clicking the ***Apply Changes*** button on each page's header. The ***Apply Changes*** button causes the changes to be saved and applied.

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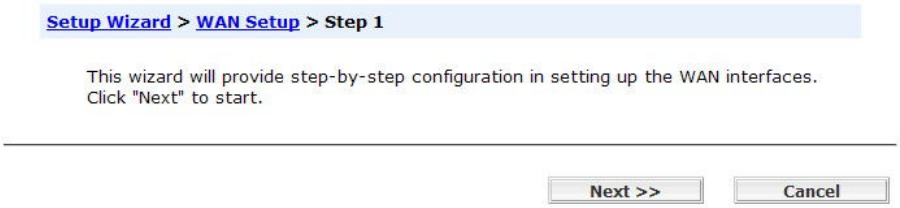
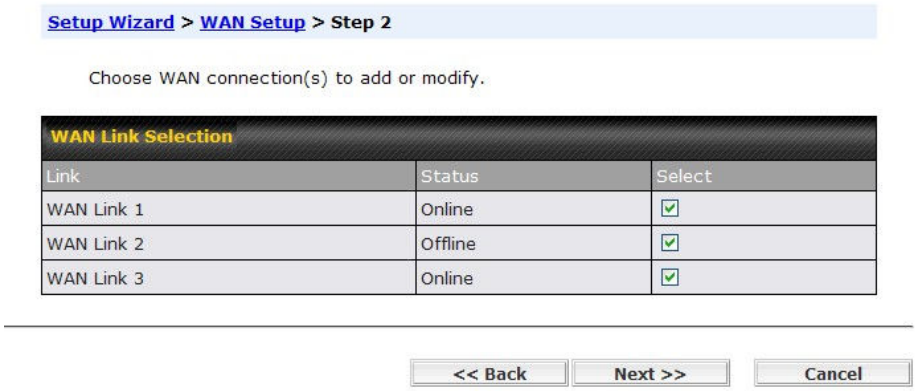
7.2 Configuration with Setup Wizard

The Setup Wizard of Peplink Balance simplifies the task of configuring WAN connection(s) by guiding the configuration process step by step.

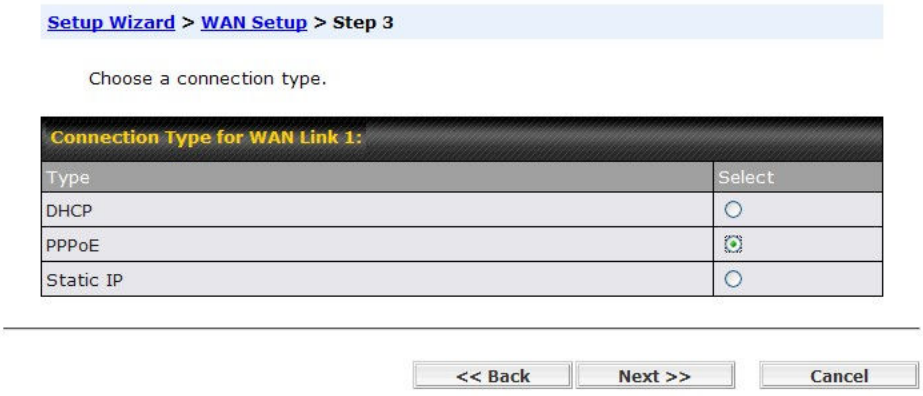
To begin, click ***Setup Wizard*** after connecting to Web Administration Interface.


Setup Wizard > WAN Setup > Step 1
This wizard will provide step-by-step configuration in setting up the WAN interfaces.
Click "Next" to start.
Next >>
Cancel

Click on the appropriate check box(es) to select the WAN connection(s) to be configured:



Select the connection type from the following screen:



Depending on the selection of connection type, further configuration may be needed. For example, PPPoE and Static IP require additional settings for the selected WAN port. Please refer to Section 10, **Configuration of WAN Interface(s)**, for details on setting up DHCP, Static IP, PPPoE, and GRE.

After finishing the last step in the Setup Wizard, please click ***Apply Changes*** on the page header to effect the configuration changes.

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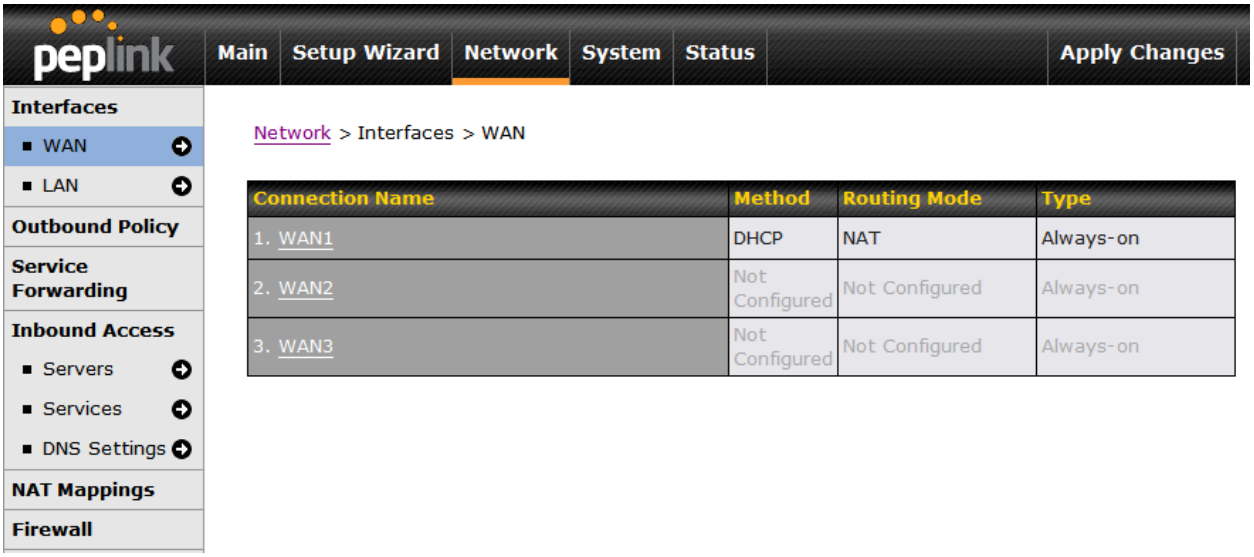
7.3 Advanced Setup

Advanced settings can be configured from the ***Network*** menu.

WAN connections can be configured by entering the corresponding WAN connection information from ***Network > Interfaces > WAN***:



Tip

Please refer to Section 10, **Configuration of WAN Interface(s)**, for details on setting up DHCP, Static IP, PPPoE, and GRE.

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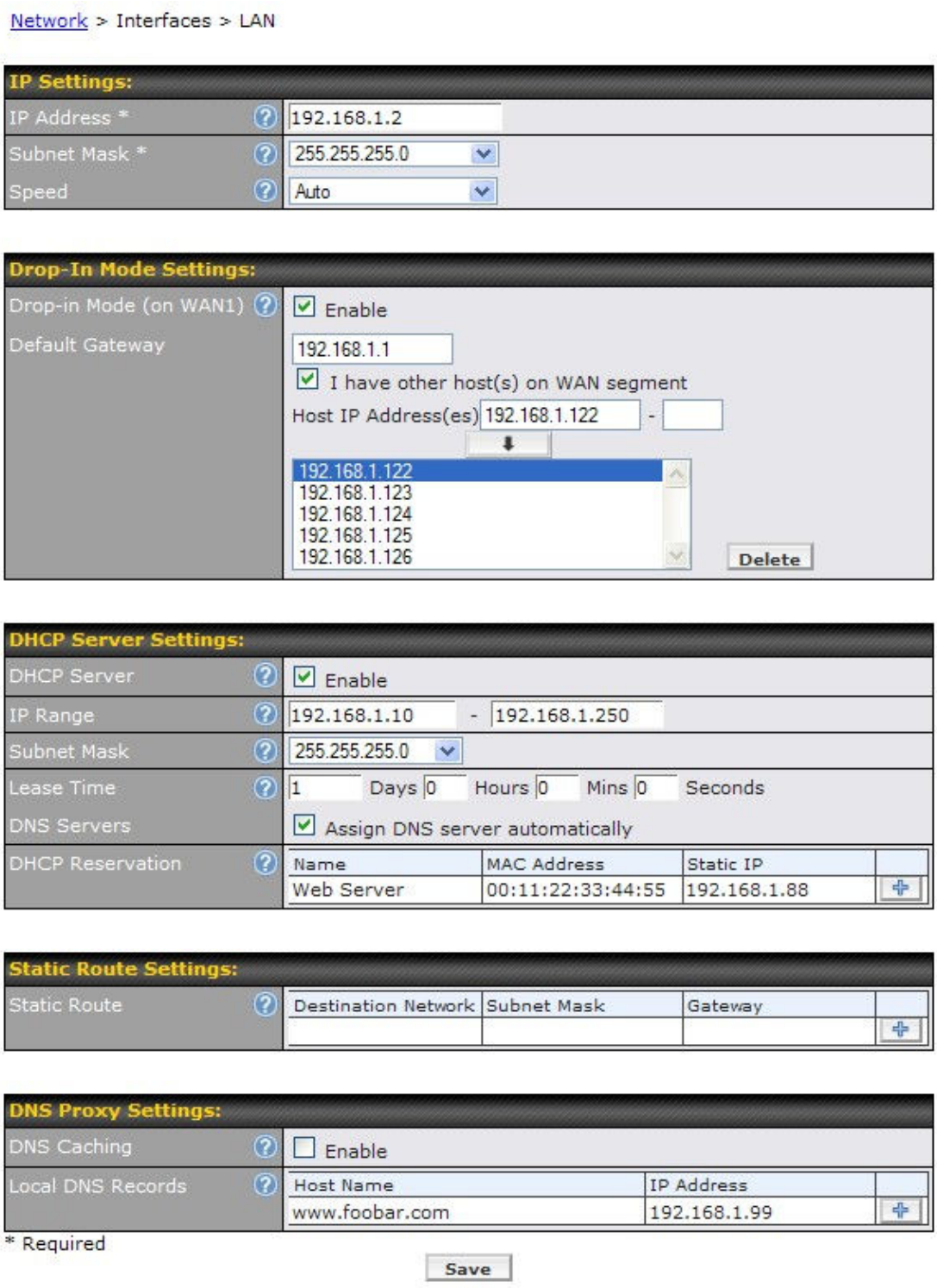
8 Configuration of LAN Interface(s)

The LAN Interface settings are located in ***Network > Interfaces > LAN***:



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LAN Settings	
IP Address & Subnet Mask	The IP address of Peplink Balance on LAN
Speed	The speed of the LAN Ethernet Port. By default, the appropriate data speed is automatically detected by Peplink Balance. In the event of synchronization issues, the port speed can be manually specified to circumvent the issues.

Drop-in Mode Settings	
IP Address & Subnet Mask	Drop-in Mode eases the installation of Peplink Balance on a live network between the existing Firewall and Router, such that no configuration changes are required on existing equipment. Please refer to section 9 Drop-in Mode for details.

DHCP Server Settings	
DHCP Server	When this setting is enabled, the DHCP server of Peplink Balance automatically assigns an IP address to each computer that is connected via LAN and configured to obtain an IP address via DHCP. Peplink Balance's DHCP server prevents IP address collision on LAN.
IP Range & Subnet Mask	This setting allocates a range of IP address that will be assigned to LAN computers by the DHCP server of Peplink Balance.
Lease Time	This setting specifies the length of time throughout which an IP address of a DHCP client remains valid. Upon expiration of the Lease Time, the assigned IP address will no longer be valid and the renewal of the IP address assignment will be required.
DNS Servers	This is to input the DNS server addresses to be offered to the DHCP clients. If ***Assign DNS server automatically*** is selected, the Peplink Balance's built-in DNS server address (i.e. LAN IP address) will be offered.
DHCP Reservation	This setting reserves the assignment of fixed IP addresses for a list of computers on the LAN. The computers to be assigned fixed IP addresses on the LAN are identified by their MAC addresses. The fixed IP address assignment is displayed as a cross-referenced list between the computers' Name, MAC addresses and fixed IP addresses. The Name field (optional) is a humanized name to represent the device. MAC addresses should be in the format of `00:AA:BB:CC:DD:EE` Press to create a new record. Press to remove a record.

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Static Route Settings	
Static Route	This table is for defining static routing rules for the LAN segment. A static route consists of the network address, subnet mask, and gateway address. The address and subnet mask values are in the format of `w.x.y.z` Press to create a new route. Press to remove a route.

DNS Proxy Settings	
DNS Caching	This field is to enable DNS caching on the built-in DNS proxy server. When the option is enabled, queried DNS replies will be cached until the records' TTL reached. This feature could improve the DNS lookup time. But it cannot return the most updated result for those frequently updated DNS records. By default, it is disabled.
Local DNS Records	This table is for defining custom local DNS records. A static local DNS record consists of a Host Name and an IP Address. When looking up the Host Name from the LAN to LAN IP of Peplink Balance, the corresponding IP Address will be returned. Press to create a new record. Press to remove a record.

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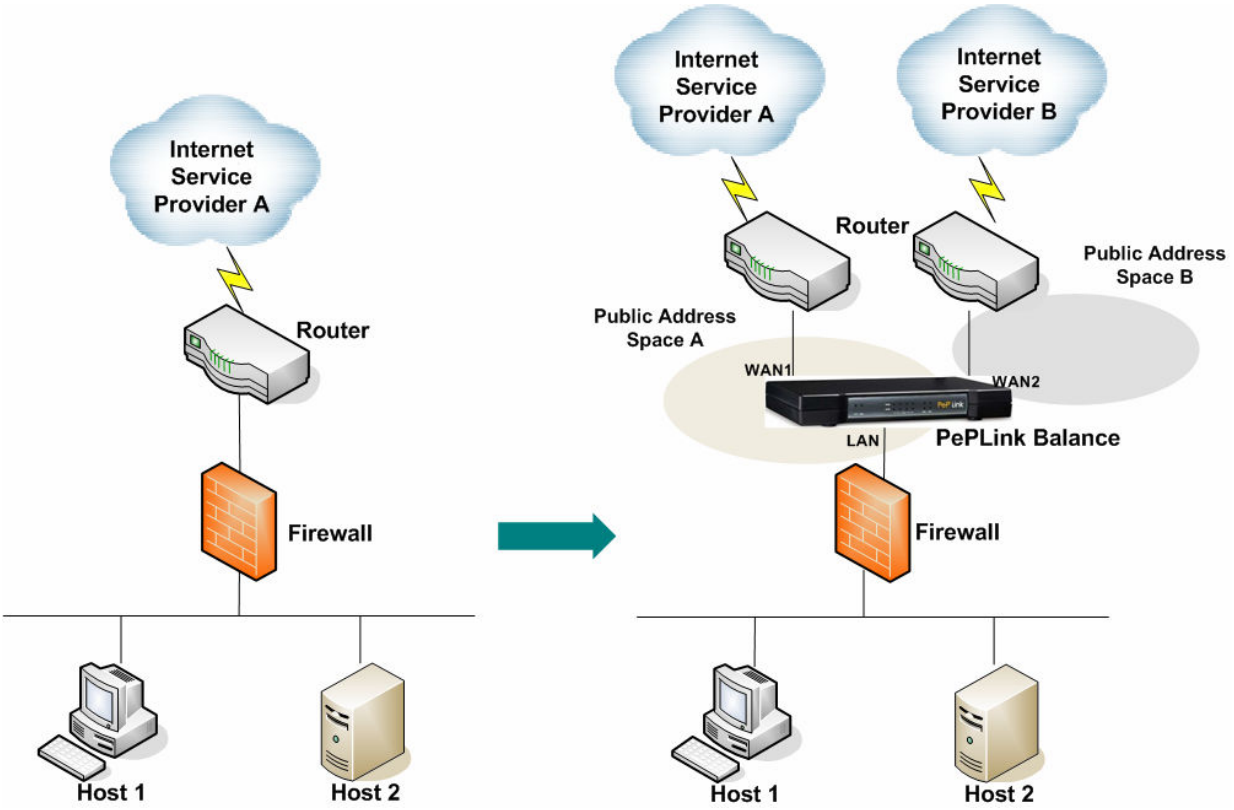
9 Drop-in Mode

Drop-in Mode (or transparent bridging mode) eases the installation of Peplink Balance on a live network between the firewall and router, such that changes to the settings of existing equipment are not required. **Drop-in Mode is not applicable to Balance 20L.**

The following diagram illustrates:



When Drop-in Mode is enabled, the LAN ports and the WAN1 port are bridged.

When operating in Drop-in Mode, Peplink Balance forwards the traffic between the LAN hosts and the router for WAN1 without performing any IP address translation. Hosts on the LAN will not notice any change in the IP addresses of the hosts on WAN1, and vice-versa. However, although the IP addresses on all of the forwarded packets remain the same, Peplink Balance inserts its own MAC address in place of the original. As a result, MAC address changes will be noticed by hosts on both the LAN and the WAN. Further details will subsequently follow.

After successfully setting up Peplink Balance as part of the network via Drop-in Mode, a Peplink Balance 200 unit will accommodate one additional WAN connection; Peplink Balance 30, 300, 380 and 390 will accommodate two additional WAN connections; Peplink Balance 700 and 710 will further accommodate six additional WAN connections.

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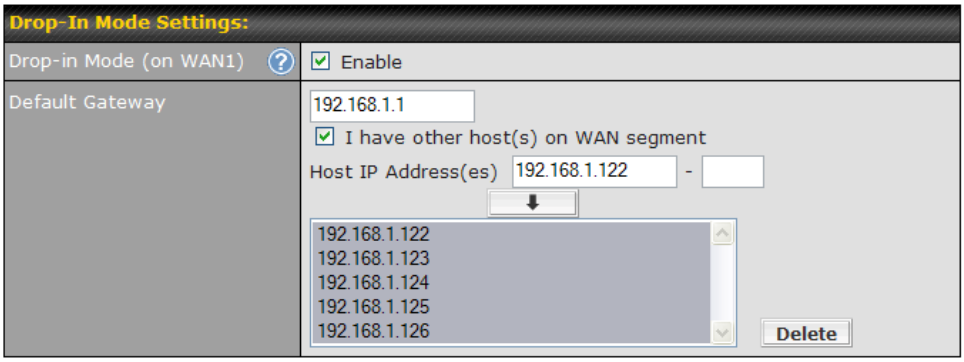
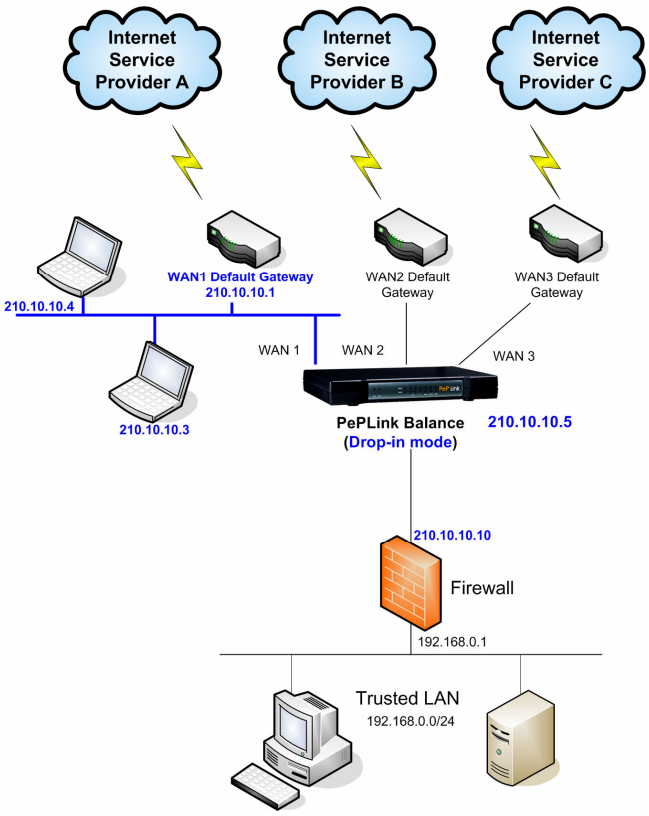
To enable Drop-in mode, perform the following steps from:

Network > Interfaces > LAN:



1. Check the **Enable** box under Drop-in Mode. (After checking the **Enable** box, most network settings for WAN1 will be hidden from Web Administration Interface.)
2. Put the IP address of the WAN1 router in the **Default Gateway** field. Ensure that the Peplink Balance IP subnet is the same as the Firewall's WAN port and the Router's LAN port.
3. If hosts other than the router exist on the WAN segment of Peplink Balance, check the **I have other host(s) on WAN segment box**, enter the IP address(es) of the host(s), and then click the down-arrow to add the hosts.

   The following diagram illustrates:



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4. Flushing ARP:

   After the installation of Peplink Balance in Drop-in Mode, the hosts on both sides of Peplink Balance will see a change in MAC addresses. Thus, the WAN default gateway and firewall need to be rebooted.

Important Note

After the installation of Peplink Balance in Drop-in Mode, the hosts on both sides of Peplink Balance will notice a change in MAC addresses. (The installation of Peplink Balance in Drop-in Mode will effect no change in IP addresses.)

More specifically, LAN hosts find that IP packets from WAN hosts report the MAC address of Peplink Balance. Similarly, WAN hosts find that the MAC address of Peplink Balance is reported by the IP packets from LAN hosts.

From a practical perspective, the mentioned change in MAC addresses is communicated, briefly after the installation of Peplink Balance, to the WAN1 router, the firewall, and hosts on the LAN via broadcast ARP packets.

The potential issue exists where the broadcast ARP packets do not reach some hosts and/or routers. Under such circumstances, the ARP table entries of the affected equipment would not be up to date and, therefore, the affected equipment would not be able to communicate.

Flushing the ARP table of the affected equipment will likely overcome this issue. Alternatively, it may also be practical to wait for the ARP table entries to refresh, or to reboot the affected equipment. (ARP table entries in Windows are refreshed every 5 seconds; other types of equipment may require greater lengths of time to refresh.)

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10 Configuration of WAN Interface(s)

The WAN interface settings are located in ***Network > Interfaces > WAN***.

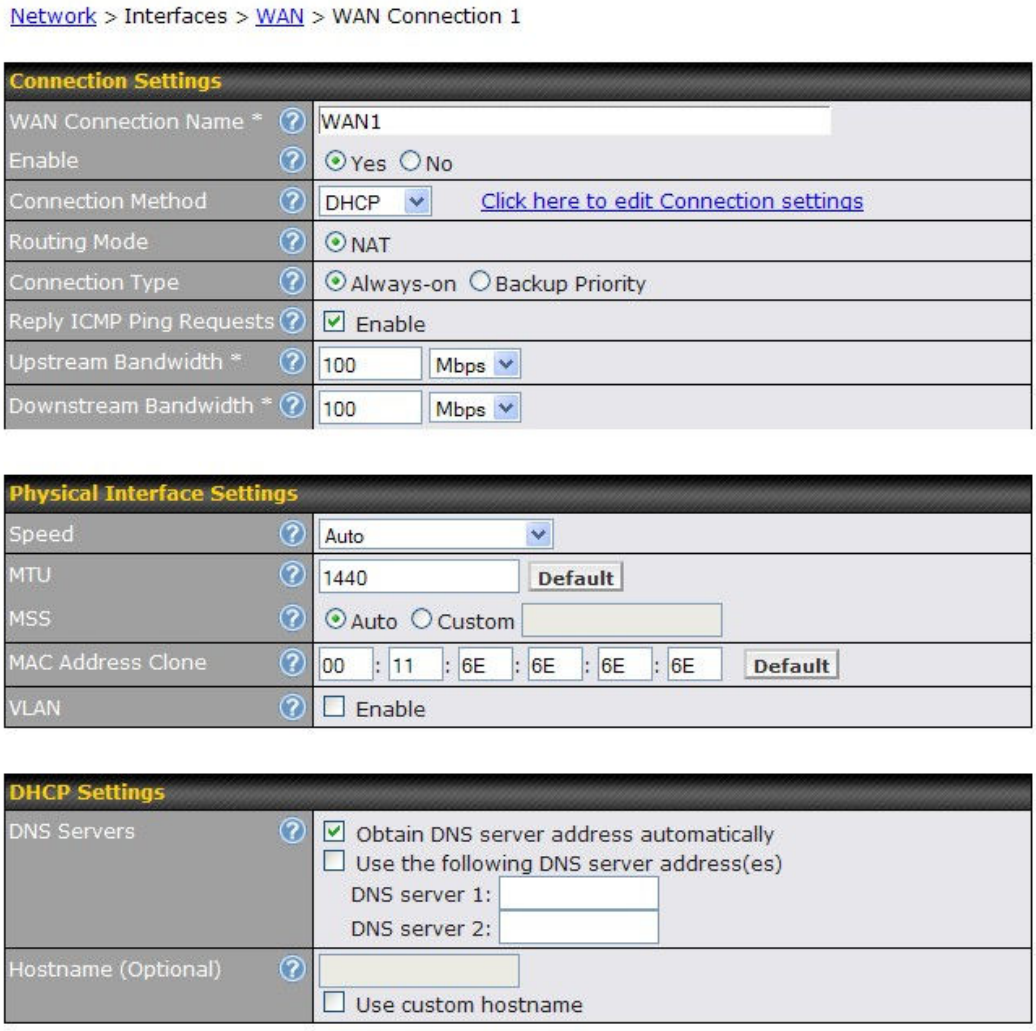
There are four possible connection methods:

- DHCP
- Static IP
- PPPoE
- GRE

The connection method and details are determined by, and can be obtained from, the ISP.

10.1 DHCP Connection

The DHCP connection method is suitable if the ISP provides an IP address automatically by DHCP (e.g. Cable, Metro Ethernet, etc.).



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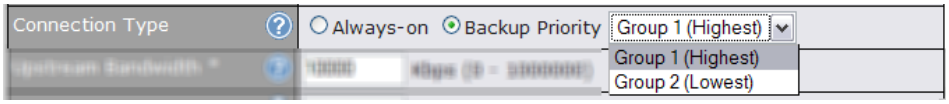
Network Settings for DHCP	
Routing Mode	This field illustrates that NAT (Network Address Translation) will be applied to the traffic routing over this WAN connection. For further details, please refer to Appendix B, **Routing under DHCP, Static IP, and PPPoE**.
Connection Type	This setting specifies the utilization of the WAN connection. The selection of ***Always-on*** results in the WAN connection to be used whenever it is available. If ***Backup Priority*** and a priority group is selected, the WAN connection is treated as a backup connection and is used only in the absence of available Always-on WAN connection(s) and higher priority backup connection(s).  The default and recommended Connection Type is ***Always-on***.
Reply ICMP Ping Requests	If this field is disabled, the WAN connection will not respond ICMP Ping requests. By default, this is enabled.
Upstream Bandwidth	This setting specifies the data bandwidth in the outbound direction from the LAN through the WAN interface.
Downstream Bandwidth	This setting specifies the data bandwidth in the inbound direction from the WAN interface to the LAN. The value of this setting is also used as the default weight value for the default outbound rule if ***Custom Outbound Traffic Rules*** in Outbound Traffic Management.

Physical Interface Settings	
Speed	This setting specifies port speed and duplex configurations. By default, Speed is set to ***Auto***.
MTU	This setting specifies the Maximum Transmission Unit. By default, MTU is set to 1440.
MSS	This setting should be configured based on the maximum payload size that the local system can handle. The MSS (Maximum Segment Size) is computed from the MTU minus 40 bytes for TCP over IPv4. If MTU is set to Auto, the MSS will also be set automatically. By default, MSS is set to ***Auto***.

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Physical Interface Settings	
MAC Address Clone	This setting allows configuring a user-specified MAC address. Some service providers (e.g. cable providers) identify the clients' MAC addresses and require a client to always connect using the same MAC address. In such cases, change the Peplink Balance WAN interface MAC address to the original client PC's via this field. The default MAC Address is a unique value assigned at the factory. In most cases, the default value suffices. Clicking the ***Default*** button restores the MAC Address to the default value.
VLAN	Some service providers require the router to enable VLAN tagging for Internet traffic. If it is required by your service provider, you can enable this field and enter the VLAN ID that the provider requires. **Note: Leave this field disabled if you are not sure.**

DHCP Settings	
DNS Servers	Each ISP may provide a set of DNS servers for DNS lookups. This setting specifies the DNS (Domain Name System) Servers to be used when a DNS lookup is routed through this connection. Selecting ***Obtain DNS server address automatically*** results in the DNS Servers assigned by the WAN DHCP Server to be used for outbound DNS lookups over the connection. (The DNS Servers are obtained along with the WAN IP address assigned from the DHCP server.) When ***Use the following DNS server address(es)*** is selected, you can put custom DNS server addresses for this WAN connection into the ***DNS server 1*** and ***DNS server 2*** fields.
Hostname	If your service provider's DHCP server requires you to supply a "hostname" value upon acquiring an IP address, you can enter the value here. If your service provider does not provide you the value, you can safely bypass this option.

Please refer to section 10.5, 10.6 and 10.7 for details about WAN Health Check, Additional Public IP Settings and Dynamic DNS Settings respectively.

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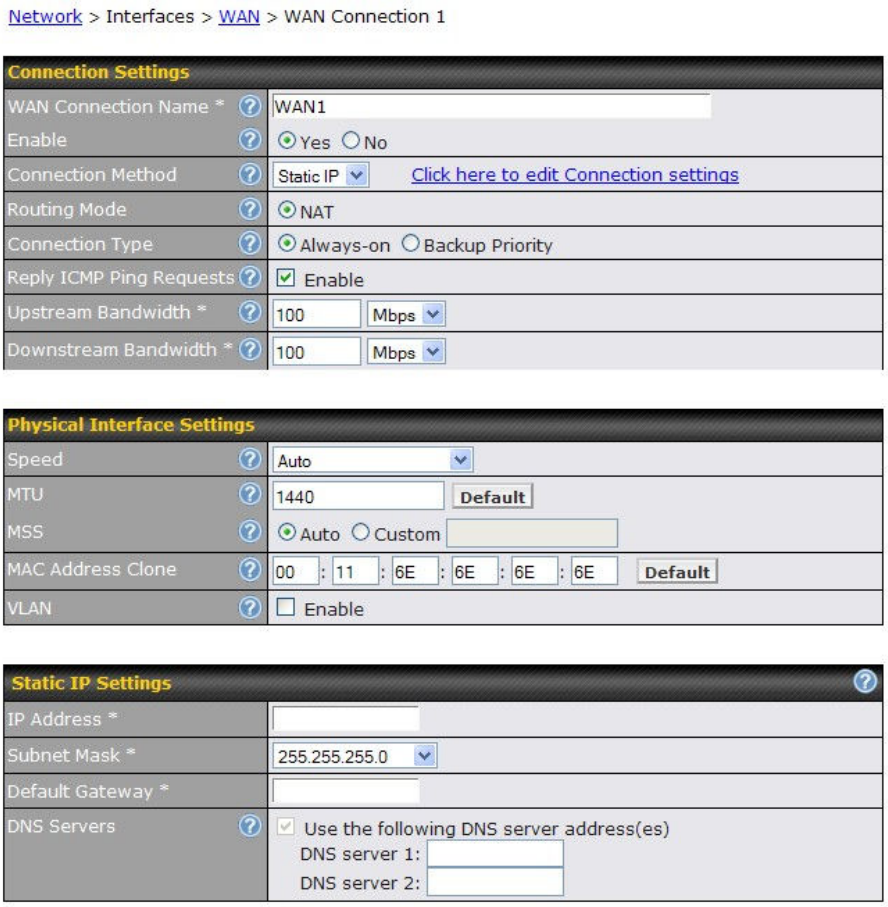
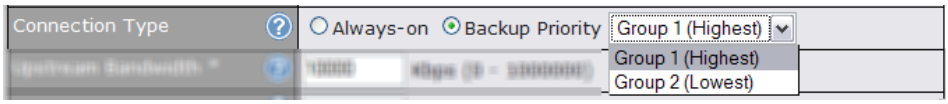
10.2 Static IP Connection

The Static IP connection method is suitable if the ISP provides a static IP address to connect directly.



Connection Settings for Static IP	
Routing Mode	This field illustrates that NAT (Network Address Translation) will be applied to the traffic routing over this WAN connection. For further details, please refer to Appendix B, **Routing under DHCP, Static IP, and PPPoE**.
Connection Type	This setting specifies the utilization of the WAN connection. The selection of ***Always-on*** results in the WAN connection to be used whenever it is available. If ***Backup Priority*** and a priority group is selected, the WAN connection is treated as a backup connection and is used only in the absence of available Always-on WAN connection(s) and higher priority backup connection(s).  The default and recommended Connection Type is ***Always-on***.

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Connection Settings for Static IP	
Reply ICMP Ping Requests	If this field is disabled, the WAN connection will not respond ICMP Ping requests. By default, this is enabled.
Upstream Bandwidth	This setting specifies the data bandwidth in the outbound direction from the LAN through the WAN interface.
Downstream Bandwidth	This setting specifies the data bandwidth in the inbound direction from the WAN interface to the LAN. The value of this setting is used as the default weight control value for outbound load balance.

Physical Interface Settings	
Speed	This setting specifies port speed and duplex configurations. By default, Speed is set to ***Auto***.
MTU	This setting specifies the Maximum Transmission Unit. By default, MTU is set to 1440.
MSS	This setting should be configured based on the maximum payload size that the local system can handle. The MSS (Maximum Segment Size) is computed from the MTU minus 40 bytes for TCP over IPv4. If MTU is set to Auto, the MSS will also be set automatically. By default, MSS is set to ***Auto***.
MAC Address	This setting allows configuring a user-specified MAC address. Some service providers (e.g. cable providers) identify the clients' MAC addresses and require a client to always connect using the same MAC address. In such cases, change the Peplink Balance WAN interface MAC address to the original client PC's via this field. The default MAC Address is a unique value assigned at the factory. In most cases, the default value suffices. Clicking the ***Default*** button restores the MAC Address to the default value.
VLAN	Some service providers require the router to enable VLAN tagging for Internet traffic. If it is required by your service provider, you can enable this field and enter the VLAN ID that the provider requires. **Note: Leave this field disabled if you are not sure.**

Static IP Settings	
IP Address / Subnet Mask / Default Gateway	These settings specify the information required in order to communicate on the Internet via a fixed Internet IP address. The information is typically determined by and can be obtained from the ISP, and include the following:

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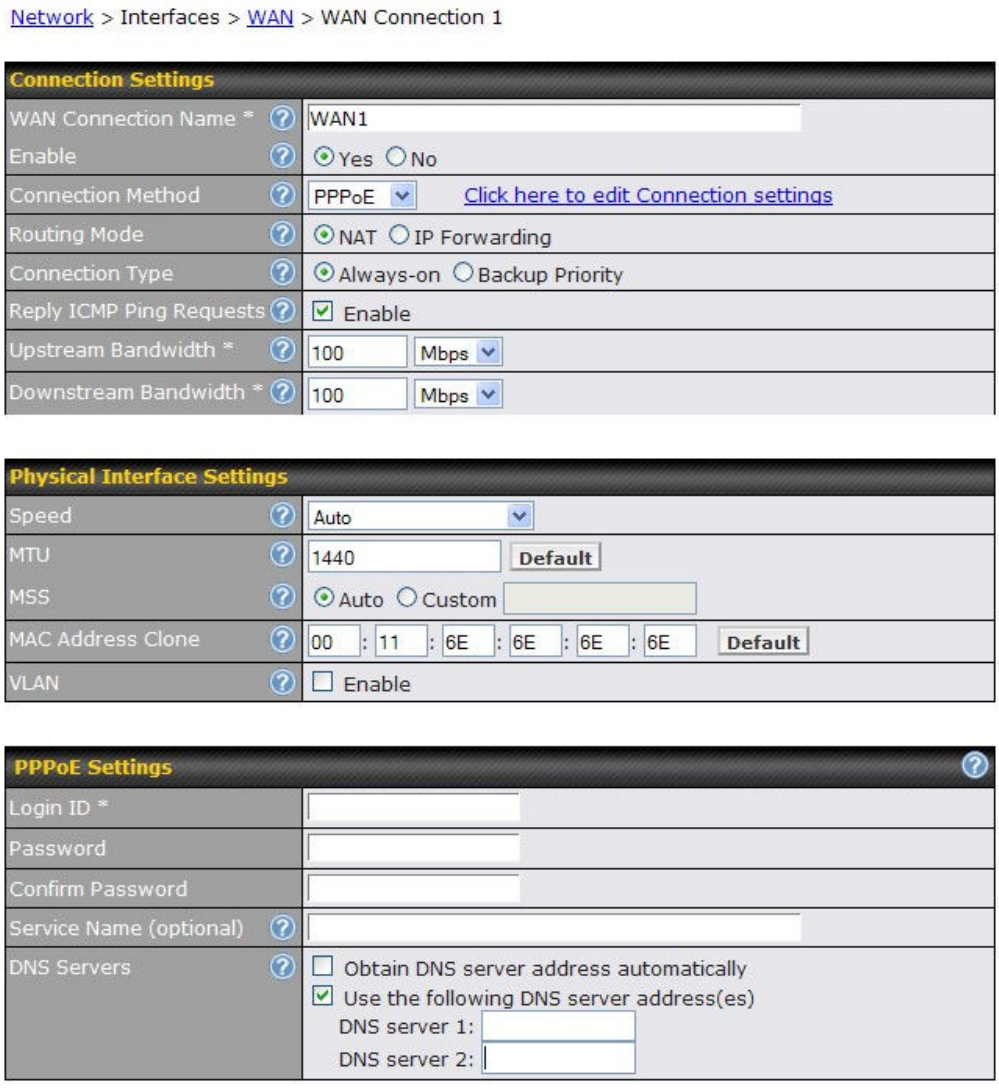
Static IP Settings	
DNS Servers	Each ISP may provide a set of DNS servers for DNS lookups. This field specifies the DNS (Domain Name System) Servers to be used when a DNS lookup is routed through this connection. You can input the ISP provided DNS server addresses into the ***DNS server 1*** and ***DNS server 2*** fields. If no address is entered here, this link will not be used for DNS lookups.

Please refer to section 10.5, 10.6 and 10.7 for details about WAN Health Check, Additional Public IP Settings and Dynamic DNS Settings respectively.

10.3 PPPoE Connection

The PPPoE connection method is suitable if the ISP provides a PPPoE login ID and password to connect via PPPoE.



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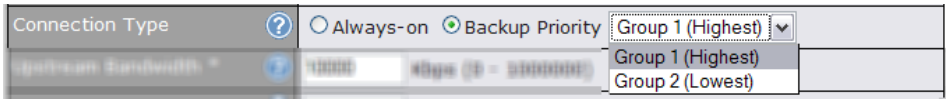
Network Settings for PPPoE	
Routing Mode	This setting selects between routing via NAT and IP Forwarding. By default, Routing Mode is set to NAT. For further details, please refer to Appendix B, **Routing under DHCP, Static IP, and PPPoE**.
Connection Type	This setting specifies the utilization of the WAN connection. The selection of ***Always-on*** results in the WAN connection to be used whenever it is available. If ***Backup Priority*** and a priority group is selected, the WAN connection is treated as a backup connection and is used only in the absence of available Always-on WAN connection(s) and higher priority backup connection(s).  The default and recommended Connection Type is ***Always-on***.
Reply ICMP Ping Requests	If this field is disabled, the WAN connection will not respond ICMP Ping requests. By default, this is enabled.
Upstream Bandwidth	This setting specifies the data bandwidth in the outbound direction from the LAN through the WAN interface.
Downstream Bandwidth	This setting specifies the data bandwidth in the inbound direction from the WAN interface to the LAN. The value is referenced when using the algorithms "Weighted Balance" (see section 12.2.1) and "Least Used" (see section 12.2.5) in Outbound Policy.

Physical Interface Settings	
Speed	This setting specifies port speed and duplex configurations. By default, Speed is set to ***Auto***.
MTU	This setting specifies the Maximum Transmission Unit. By default, MTU is set to 1440.
MSS	This setting should be configured based on the maximum payload size that the local system can handle. The MSS (Maximum Segment Size) is computed from the MTU minus 40 bytes for TCP over IPv4. If MTU is set to Auto, the MSS will also be set automatically. By default, MSS is set to ***Auto***.

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Physical Interface Settings	
MAC Address	This setting allows configuring a user-specified MAC address. Some service providers (e.g. cable providers) identify the clients' MAC addresses and require a client to always connect using the same MAC address. In such cases, change the Peplink Balance WAN interface MAC address to the original client PC's via this field. The default MAC Address is a unique value assigned at the factory. In most cases, the default value suffices. Clicking the ***Default*** button restores the MAC Address to the default value.
VLAN	Some service providers require the router to enable VLAN tagging for Internet traffic. If it is required by your service provider, you can enable this field and enter the VLAN ID that the provider requires. **Note: Leave this field disabled if you are not sure.**

PPPoE Settings	
Login ID and Password	These settings specify the information required in order to connect via PPPoE to the ISP. The information is typically determined by and can be obtained from the ISP, and include the following: • Login ID • Password
Service Name (Optional)	Service Name is a PPPoE parameter which is provided by the ISP. **Note: Leave this field empty if you are not sure.**
DNS Servers	Each ISP may provide a set of DNS servers for DNS lookups. This setting specifies the DNS (Domain Name System) Servers to be used when a DNS lookup is routed through this connection. Selecting ***Obtain DNS server address automatically*** results in the DNS Servers assigned by the PPPoE server to be used for outbound DNS lookups over the WAN connection. (The DNS Servers are obtained along with the WAN IP address assigned from the PPPoE server.) When ***Use the following DNS server address(es)*** is selected, you can put custom DNS server addresses for this WAN connection into the ***DNS server 1*** and ***DNS server 2*** fields.

Please refer to section 10.5, 10.6 and 10.7 for details about WAN Health Check, Additional Public IP Settings and Dynamic DNS Settings respectively.

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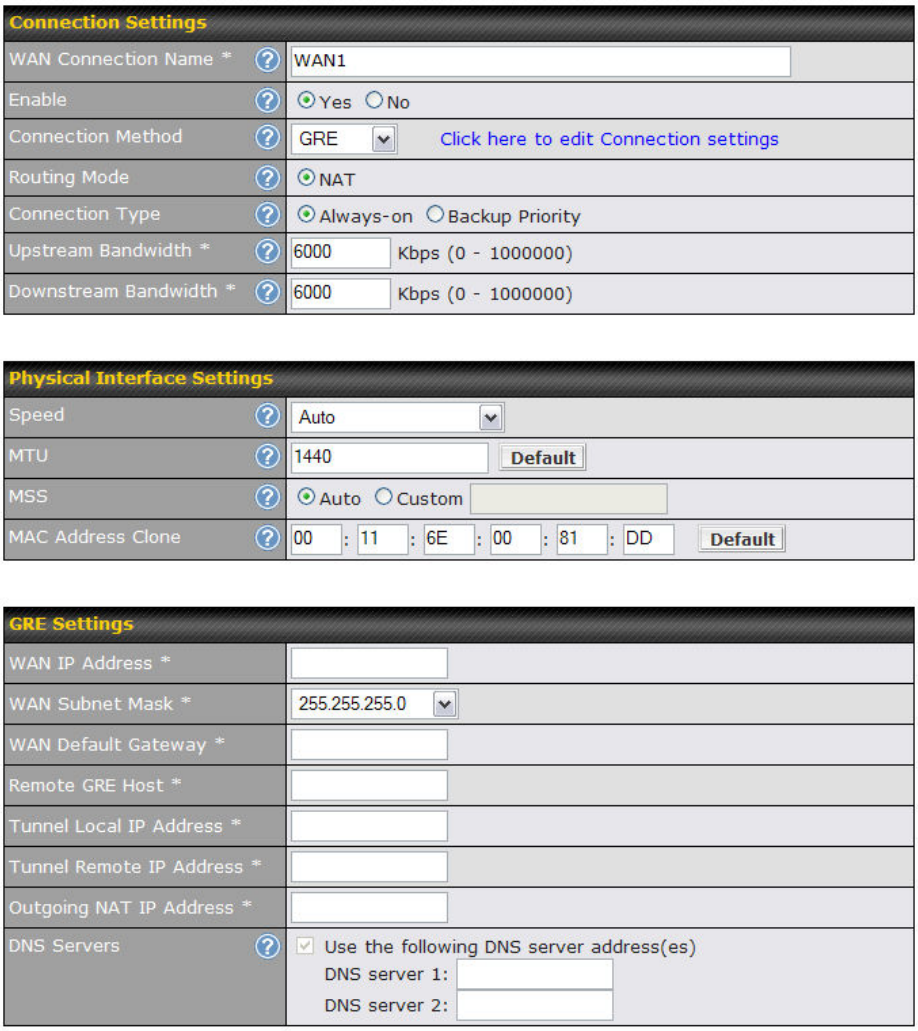
10.4 GRE Connection

The GRE connection method is suitable if the ISP provides GRE tunnel access through a private network to the Internet.



Network Settings for GRE	
Routing Mode	This field illustrates that NAT (Network Address Translation) will be applied to the traffic routing over this WAN connection. For further details, please refer to the following sections: • Section 10.4.1, **Routing under GRE via Network Address Translation (NAT)** • Section 10.4.2, **Routing under GRE via IP Forwarding**

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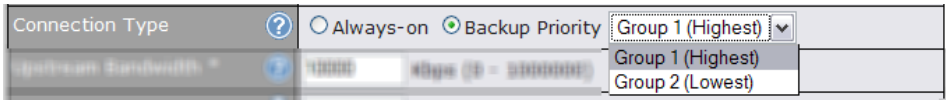
Network Settings for GRE	
Connection Type	This setting specifies the utilization of the WAN connection. The selection of ***Always-on*** results in the WAN connection to be used whenever it is available. If ***Backup Priority*** and a priority group is selected, the WAN connection is treated as a backup connection and is used only in the absence of available Always-on WAN connection(s) and higher priority backup connection(s).  The default and recommended Connection Type is ***Always-on***.
Reply ICMP Ping Requests	If this field is disabled, the WAN connection will not respond ICMP Ping requests. By default, this is enabled.
Upstream Bandwidth	This setting specifies the data bandwidth in the outbound direction from the LAN through the WAN interface.
Downstream Bandwidth	This setting specifies the data bandwidth in the inbound direction from the WAN interface to the LAN. The value of this setting is used as the default weight control value for outbound load balance.

Physical Interface Settings	
Speed	This setting specifies port speed and duplex configurations. By default, Speed is set to ***Auto***.
MTU	This setting specifies the Maximum Transmission Unit. If you choose Auto, the MTU will be detected automatically when the WAN connection goes up. If you choose Custom, you can specify the MTU manually. By default, the MTU is set to 1440.
MSS	This setting should be configured based on the maximum payload size that the local system can handle. The MSS (Maximum Segment Size) is computed from the MTU minus 40 bytes for TCP over IPv4. If MTU is set to Auto, the MSS will also be set automatically. By default, MSS is set to ***Auto***.

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Physical Interface Settings	
MAC Address	This setting allows configuring a user-specified MAC address. Some service providers (e.g. cable providers) identify the clients' MAC addresses and require a client to always connect using the same MAC address. In such cases, change the Peplink Balance WAN interface MAC address to the original client PC's via this field. The default MAC Address is a unique value assigned at the factory. In most cases, the default value suffices. Clicking the ***Default*** button restores the MAC Address to the default value.
VLAN	Some service providers require the router to enable VLAN tagging for Internet traffic. If it is required by your service provider, you can enable this field and enter the VLAN ID that the provider requires. **Note: Leave this field disabled if you are not sure.**

GRE Settings	
GRE Settings	Please refer to the following sections for further details: • Section 10.4.1, **Routing under GRE via Network Address Translation (NAT)** • Section 10.4.2, **Routing under GRE via IP Forwarding** The values for ***DNS server 1*** and ***DNS server 2*** are typically determined by, and can be obtained from, the ISP.
DNS Servers	Each ISP may provide a set of DNS servers for DNS lookups. This field specifies the DNS (Domain Name System) Servers to be used when a DNS lookup is routed through this connection. You can input the ISP provided DNS server addresses into the ***DNS server 1*** and ***DNS server 2*** fields. If no address is entered here, this link will not be used for DNS lookups.

Please refer to section 10.5, 10.6 and 10.7 for details about WAN Health Check, Additional Public IP Settings and Dynamic DNS Settings respectively.

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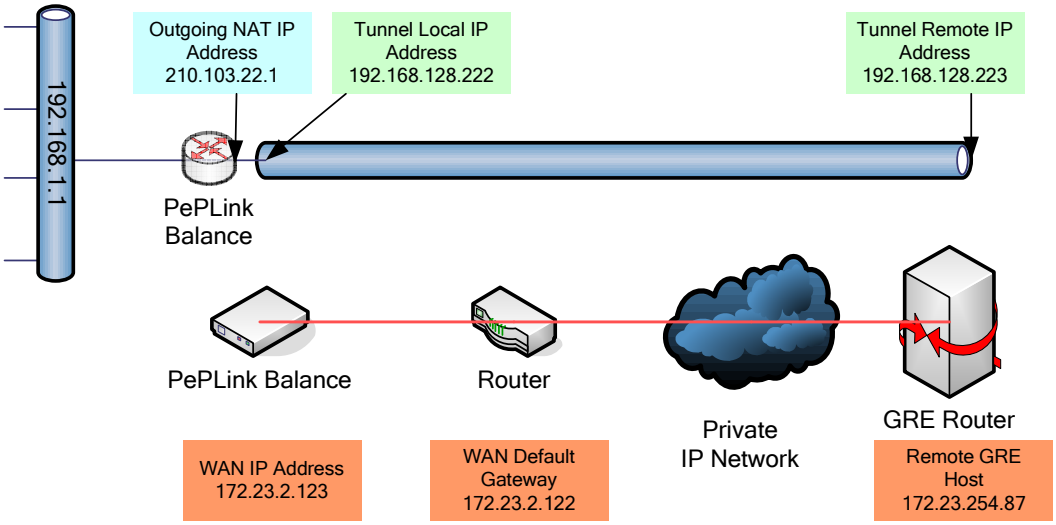
10.4.1 Routing under GRE via Network Address Translation (NAT)

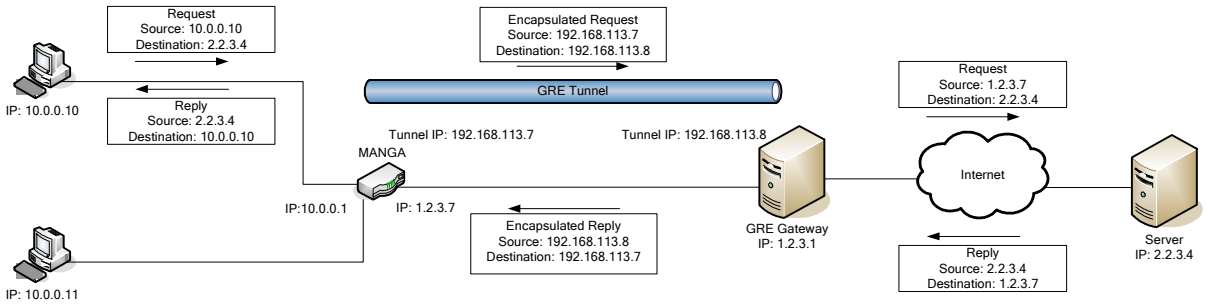
The following figure shows a typical scenario with Peplink Balance under the GRE connection mode and NAT routing mode:



In this scenario, the IP address settings are as follows:

- WAN IP Address: 172.23.2.123
- Default Gateway: 172.23.2.122
- Remote GRE IP address: 172.23.254.87 (GRE router or host's IP address)
- Tunnel IP remote address: 192.168.128.223 (IP address of remote end of tunnel)
- Tunnel IP local address: 192.168.128.222 (IP address of local end of tunnel)
- Outgoing NAT IP address: 210.103.22.1 (This field is used for NAT routing mode only. For all outgoing traffic, the IP datagram will be sent via this IP address through the tunnel; as a result, the Outgoing NAT IP address is the public address that is seen by all external hosts on the WAN.)

The following figure shows the packet flow for Peplink Balance under GRE connection mode and NAT routing mode:



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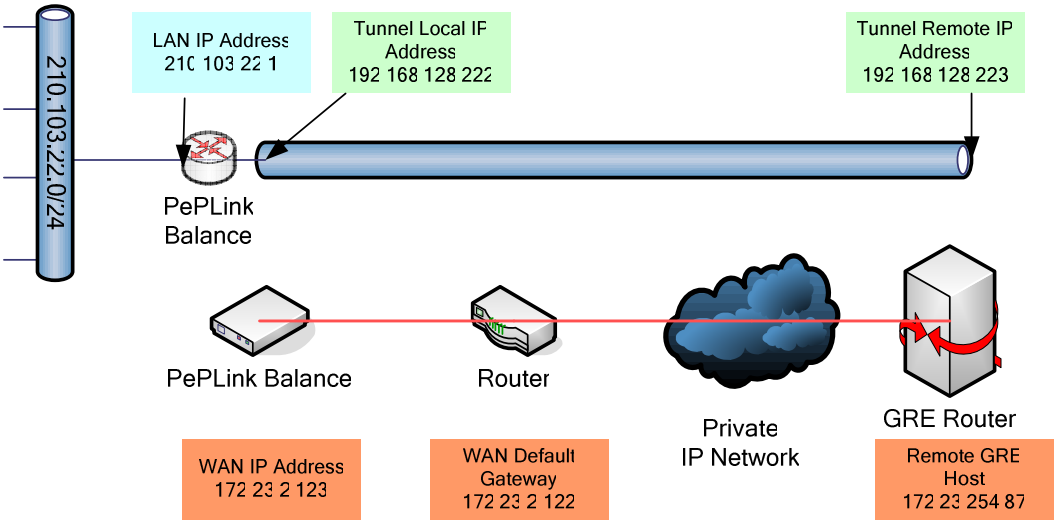
10.4.2 Routing under GRE via IP Forwarding

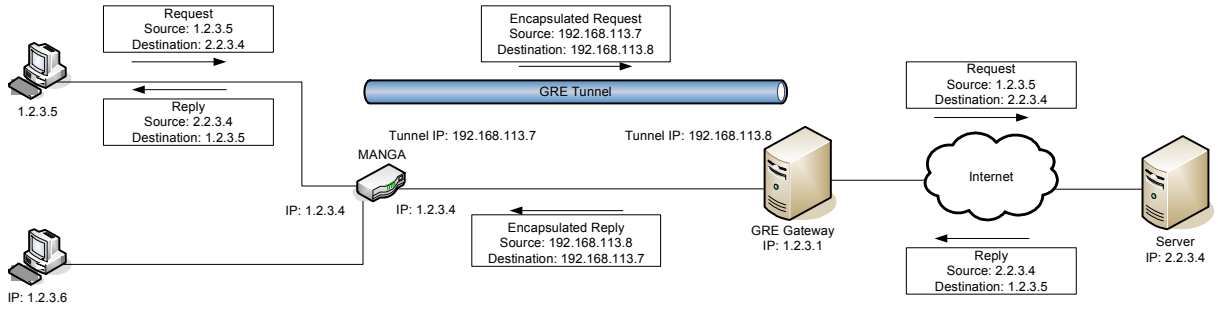
The following figure shows a typical scenario with Peplink Balance under the GRE connection mode and IP Forwarding routing mode:



In this scenario, the IP address settings are as follows:

- WAN IP Address: 172.23.2.123
- Default Gateway: 172.23.2.122
- Remote GRE IP address: 172.23.254.87 (the GRE router or host's IP address)
- Tunnel IP remote address: 192.168.128.223 (IP address of remote end of tunnel)
- Tunnel IP local address: 192.168.128.222 (IP address of local end of tunnel)
- LAN IP Address: 210.103.22.1

The following figure shows the packet flow for Peplink Balance under GRE connection mode and IP Forwarding routing mode:



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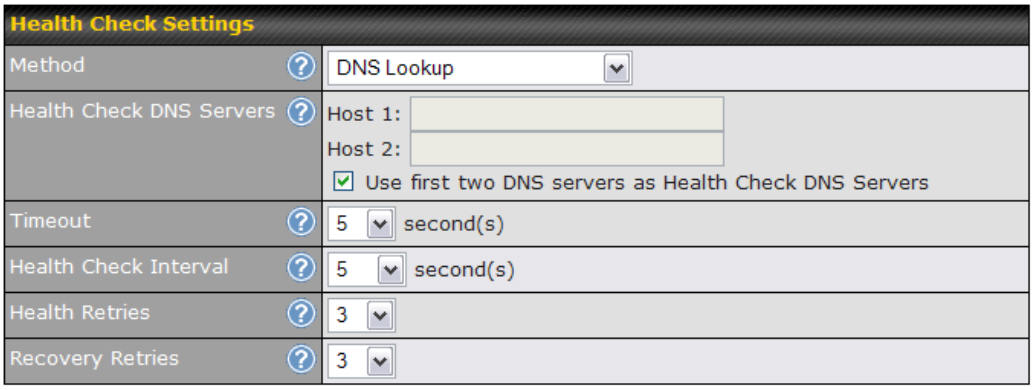
10.5 WAN Health Check

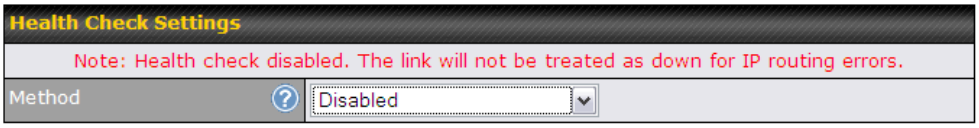
To ensure traffic is only routed to health WAN connections only, Peplink Balance provides the functionality to periodically check the health of each WAN connection.

The Health Check settings for each WAN connection can be independently configured via ***Network > Interfaces > WAN***:



Health Check Settings	
Method	This setting specifies the health check method for the WAN connection. The value of Method can be configured as ***Disabled***, ***Ping*** or ***DNS Lookup***. The default method is ***DNS Lookup***.

Health Check Disabled


Health Check Settings
Note: Health check disabled. The link will not be treated as down for IP routing errors.
Method
Disabled

When Disabled is chosen in the Method field, the WAN connection will always be considered "up". The connection will **not** be treated as down in the event of IP routing errors.

Health Check Method: Ping

The ICMP Ping packets will be issued to test the connectivity with a configurable target IP address or hostname. A WAN connection is considered "up" if ping responses are received from either one or both of the ping hosts.

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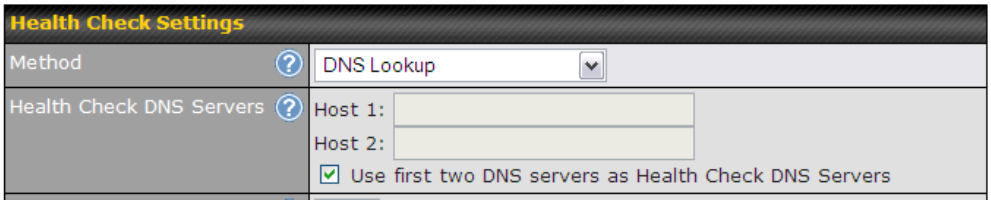
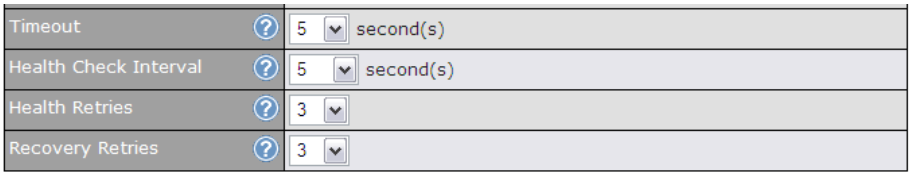
Health Check Settings	
Ping Hosts	This setting specifies IP addresses or host names with which connectivity is to be tested via ICMP Ping. If ***Use first two DNS servers as Ping Hosts*** is checked, the target ping host will be the first DNS server for the corresponding WAN connection. Reliable ping hosts with a high up-time should be considered. By default, the first two DNS servers of the WAN connection are used as the Ping Hosts.
Health Check Method: DNS Lookup	
 DNS lookups will be issued to test the connectivity with target DNS servers. The connection will be treated as up if DNS responses are received from either one or both of the servers, regardless of whether the result was positive or negative.	
Health Check DNS Servers	This field specifies two DNS hosts' IP address with which connectivity is to be tested via DNS Lookup If ***Use first two DNS servers as Health Check DNS Servers*** is checked, the target DNS hosts will be the first two DNS servers assigned to this WAN connection. Reliable targets with a high up-time should be considered. By default, the first two DNS servers of the WAN connection are used as the Health Check DNS Servers.

Other Health Check Settings	
	
Timeout	This setting specifies the timeout, in seconds, for ping/DNS lookup requests. Default Timeout is set to 5 second.
Health Check Interval	This setting specifies the time interval, in seconds, between ping or DNS lookup requests. Default Health Check Interval is 5 seconds.

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Other Health Check Settings	
Health Retries	This setting specifies the number of consecutive ping/DNS lookup timeouts after which Peplink is to treat the corresponding WAN connection as "down". Default Health Retries is set to 3. For example, with the default Health Retries setting of 3, after consecutive 3 timeouts, the corresponding WAN connection will be treated as "down".
Recovery Retries	This setting specifies the number of consecutive successful ping/DNS lookup responses that must be received before the Peplink treats a previously "down" WAN connection to be "up" again. By default, Recover Times is set to 3. For example, with the default Recover Retries setting of 3, a WAN connection that was treated as "down" will be considered to be "up" again upon receiving 3 consecutive successful ping/DNS lookup responses.

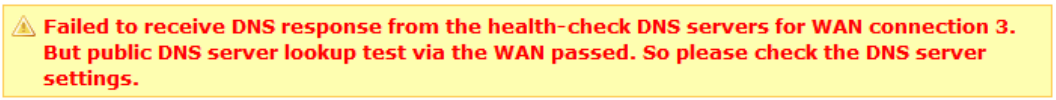
Note

In case a WAN connection goes down, all of the WAN connections with non-Always-on Connection Type will also be brought up until any one of higher priority WAN connections is up and found to be healthy. This design could increase the overall network availability.

For example, if WAN1, WAN2 and WAN3 have the connection types of Always-on, Backup Priority Group 1 and Backup Priority Group 2 respectively, when WAN1 goes down, WAN2 and WAN3 will also try to connect. If WAN3 is connected first, WAN2 will still be kept connecting. If WAN2 is connected, WAN3 will disconnect or abort making connection.

Automatic Public DNS Server Check on DNS Test Failure

In case the health check method is set to DNS Lookup and checks failed, the Balance will automatically perform DNS lookups on some public DNS servers. If the tests are success, it means the WAN may not be down but rather the target DNS server became malfunctioned. You will see the following warning message on the Main page.


Failed to receive DNS response from the health-check DNS servers for WAN connection 3. But public DNS server lookup test via the WAN passed. So please check the DNS server settings.

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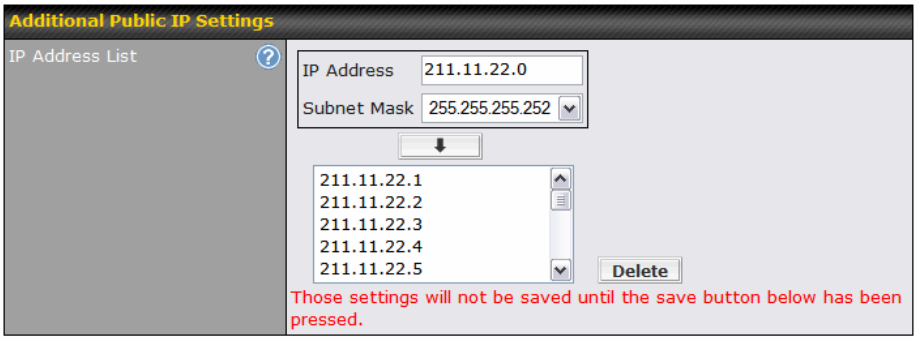
10.6 Additional Public IP Settings



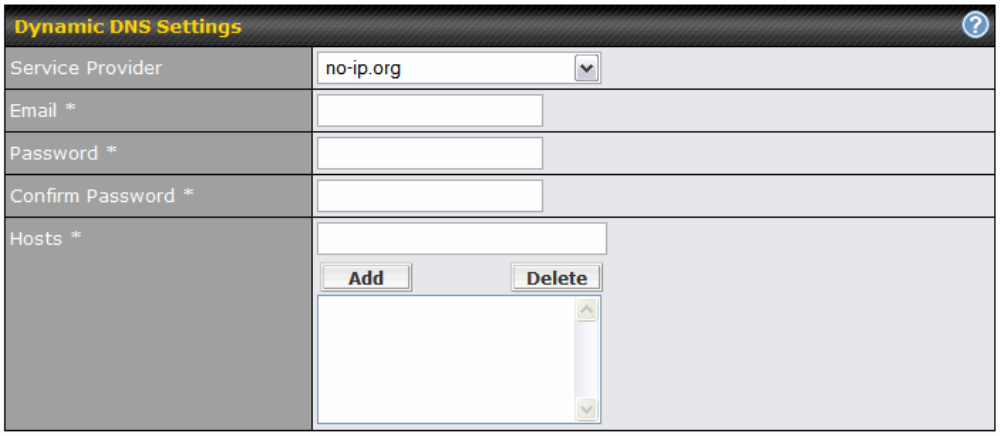
Additional Public IP Settings	
IP Address List	The IP Address List represents the list of fixed Internet IP addresses assigned by the ISP, in the event that more than one Internet IP addresses are assigned to this WAN connection. Enter the fixed Internet IP addresses and the corresponding subnet mask, and then click the ***Down Arrow*** button to populate IP address entries to the IP Address List.

10.7 Dynamic DNS Settings

Peplink Balance provides the functionality to register the domain name relationships to dynamic DNS service providers. Through registration with dynamic DNS service provider(s), the default public Internet IP address of each WAN connection can be associated with a host name.

Either upon a change in IP address or every 23 days without link reconnection, Peplink Balance will connect to the dynamic DNS service provider to perform an IP address update within the provider's records.

The settings for dynamic DNS service provider(s) and the association of hostname(s) are configured via ***Network > Interfaces > WAN***:



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Dynamic DNS Settings	
Service Provider	This setting specifies the dynamic DNS service provider to be used for the WAN based on supported dynamic DNS service providers: • changeip.com • dyndns.org • no-ip.org • tzo.com Select ***Disabled*** to disable this feature.
User ID / User / Email	This setting specifies the registered user name for the dynamic DNS service.
Password / Pass / TZO Key	This setting specifies the password for the dynamic DNS service.
Hosts / Domain	This setting specifies a list of hostnames or domains to be associated with the public Internet IP address of the WAN connection.

Important Note
In order to use dynamic DNS services, appropriate hostname registration(s), as well as a valid account with a supported dynamic DNS service provider are required. A dynamic DNS update is performed whenever a WAN's IP address changed. E.g. IP is changed after a DHCP IP refresh, reconnection, etc. Due to dynamic DNS service providers' policy, a dynamic DNS host would expire automatically because the host record was not updated for a long time. Therefore Peplink Balance performs an update every 23 days even if a WAN's IP address did not change.

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11 Site-to-Site VPN

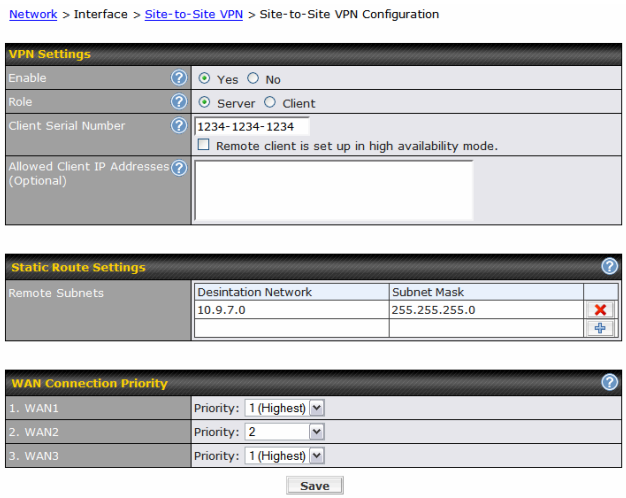
(This section applies only to Peplink Balance 380, 390, 700 and 710.)

Peplink Balance site-to-site VPN functionality securely connects a branch office to your company's main headquarters or to other branches. The data, voice, or video communications between these locations are kept confidential across the public Internet.

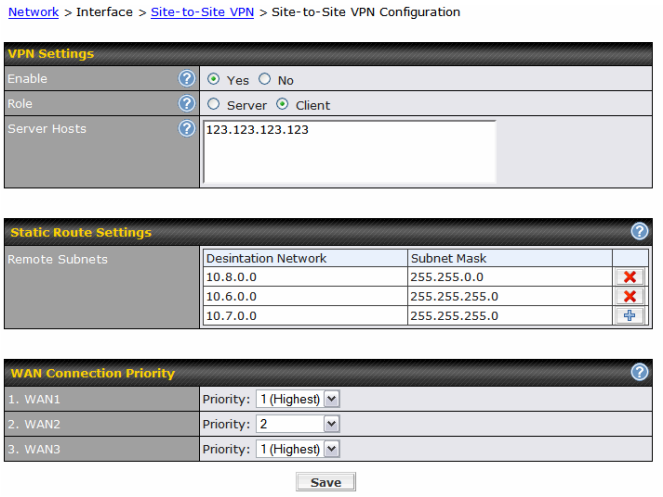
The Site-to-Site VPN of the Peplink Balance is specifically designed for multi-WAN environment. The Peplink Balance can aggregate all WAN connections' bandwidth for routing site-to-site VPN traffic. Unless all the WAN connections of one site are done, the Peplink Balance could still maintain VPN to be up and running.

The Peplink Balance must be set as a Server or a Client on both end of the VPN. When one end is a "client", the other end must be a "server". A client connects to a server. A server waits for connections from a client. The server listens on TCP port 22143 of all WAN connections' IP addresses.

Please refer to section 19.2 for "Site-to-Site VPN Status".



Setup screen for server



Setup screen for client

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General Site-to-Site VPN Settings	
Enable	Select Yes to enable and No to disable the VPN service.
Role	To select the Peplink Balance to act as a Server or a Client. It is favorable for a Peplink Balance to act as a server if all of its WAN connections also have Internet IP address(es) and at least one of them is a static one. If the server end does not have any static Internet IP address, you can set up dynamic DNS service for the WAN connections. On the client end, enter the server's dynamic DNS host names into the Server Hosts field.
Remote Subnets	By default, only the remote LAN's subnet will be routed through the VPN. If the remote end has multiple subnets and you want to make use of the VPN to reach the subnets, you can input the subnets' addresses here. NOTE: Make sure the remote end's Static Routes of the LAN Settings page (see section 8) also included the same routes.
WAN Connectivity Priority	You can specify the priority of the WAN connections to be used for making VPN connections. WAN connections set to OFF will never be used. Only available WAN connections with the highest priority will be used for making VPN connections. Outgoing traffic will be distributed evenly if more than one connection that have the same priority.

Server Settings	
Client Serial Number	The server only accepts connections made from a client with the serial number specified here. If the remote end is in high availability setup, you can check the check box "Remote client is set up in high availability mode." and enter the second unit's serial number into the second text box.
Allowed Client IP Addresses (Optional)	If all of the client's Internet IP address(es) are static, you can enter them in this field. The server will then only accept connections made from the listed IP address(es). One line for each IP address. If this field is empty, such access control will be disabled.

Client Settings	
Server Hosts	Enter server's Internet host names and/or IP addresses here. You may enter only one of the server's Internet IP addresses/host names here even if the server has multiple WAN connections. The client and server will exchange its WAN IP addresses to each other for any WAN connection state change. The client will connect to all of the default or specified IP address of each server WAN connections via all of client's WAN connections.

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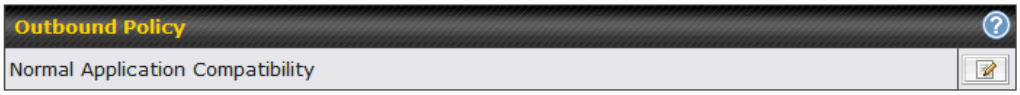
12 Management of Outbound Traffic to WAN

Peplink Balance provides the functionality to flexibly manage and load balance outbound traffic among the WAN connections.

The settings for managing and load balancing outbound traffic are located in ***Network > Outbound Policy***:



12.1 Outbound Traffic Policy

There are three main selections for the Outbound Traffic Policy of Peplink Balance:

- High Application Compatibility
- Normal Application Compatibility
- Custom Outbound Traffic Rules

The selections are explained as follows:

Outbound Traffic Policy Settings	
High Application Compatibility	With the selection of this policy, outbound traffic from a source LAN device is routed through the same WAN connection regardless of the destination Internet IP address and protocol. This provides the highest application compatibility.
Normal Application Compatibility	With the selection of this policy, outbound traffic from a source LAN device to the same destination Internet IP address will persistently be routed through the same WAN connection regardless of protocol. This provides high compatibility to most applications, and users still benefit from WAN link load balancing when multiple Internet servers are accessed.
Managed by Custom Rules	With the selection of this policy, outbound traffic behavior can be managed by defining custom rules. Rules can be defined in a custom rule table. A default rule can be defined for connections that cannot match any one of the rules.

The default policy is Normal Application Compatibility.

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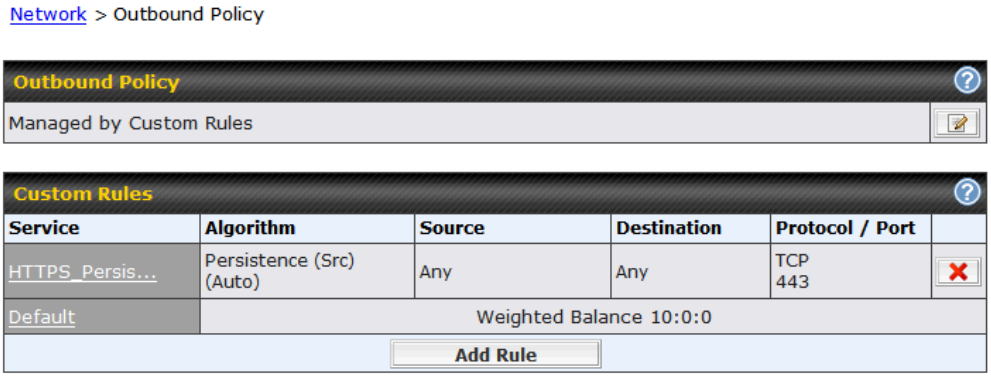
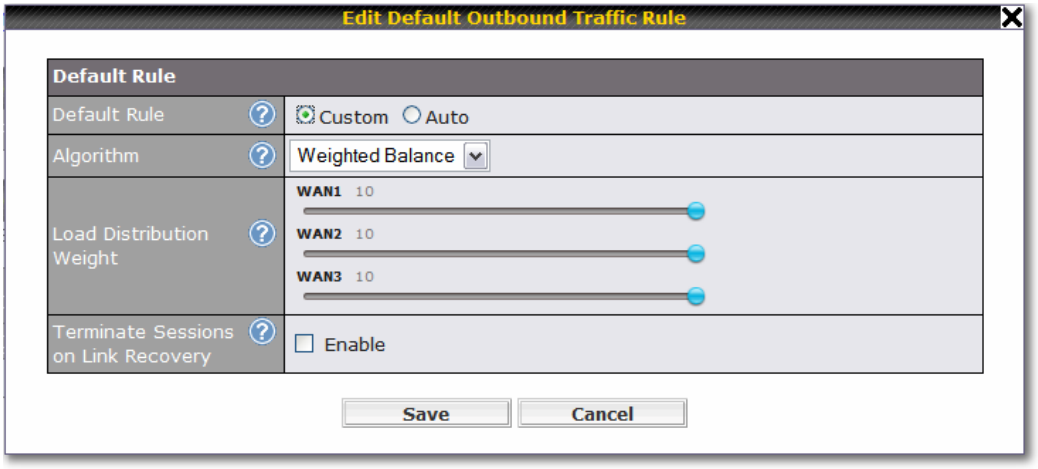
12.2 Fine Tuning Load Distribution for Individual Services

Choose ***Managed by Custom Rules*** by clicking in the Outbound Policy form, choose the desired policy and press the "Save" button. The following screen will then be displayed.



The bottom most rule is "Default". Click on it to change the device's default way to control outbound traffic for all connections that does not match any rules above. Click the service "Default" to change its setting.



By default, the Default Rule "Auto" is chosen. You can change a custom algorithm to be used. Please refer to the coming sections for the details of the available algorithms.

To create a custom outbound traffic rule, click ***Add Rule*** at the bottom of the table, upon which the following window is displayed:

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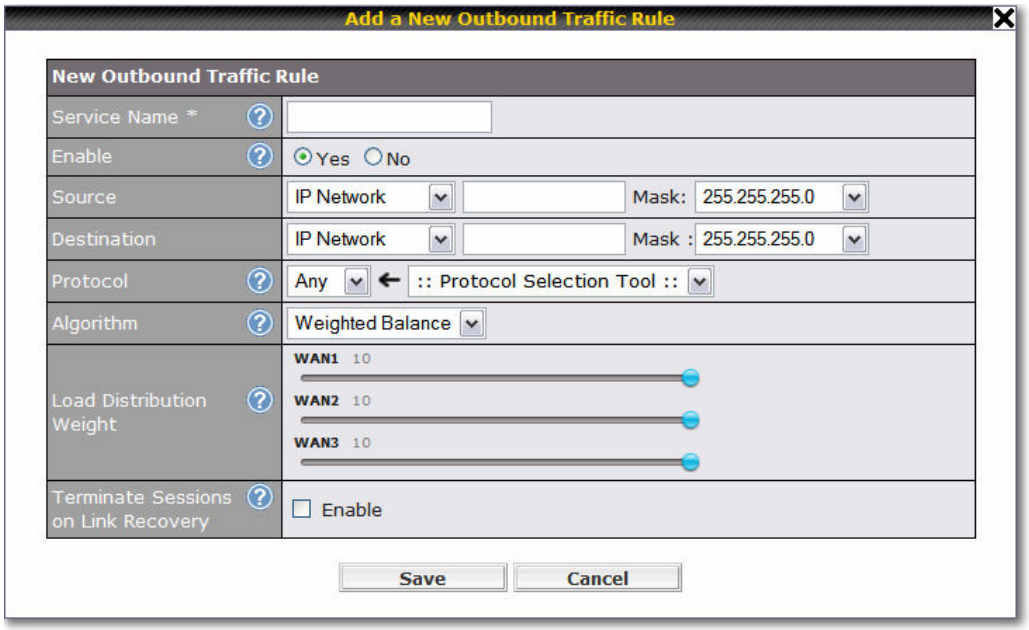

Load Distribution Settings	
Service Name	This setting specifies the name of the outbound traffic rule.
Enable	This setting specifies whether the outbound traffic rule takes effect. With an Enable value of ***Yes***, the rule takes effect: traffic is matched, and actions are taken, by Peplink Balance based on the other parameters of the rule. With an Enable value of ***No***, the rule does not take effect: Peplink Balance disregards the other parameters of the rule.
Source	This setting specifies the source IP Address, IP Network or MAC Address for traffic that matches the rule.
Destination	This setting specifies the destination IP Address or IP Network for traffic that matches the rule.
Protocol and Port	This setting specifies the IP Protocol and Port of traffic that matches this rule. You may select some common protocol from the ***Protocol Selection Tool*** drop-down menu.
Algorithm	This setting specifies the behavior of Peplink Balance for the outbound traffic rule. One of the following values can be specified: • Weighted Balance • Persistence • Enforced • Priority • Least Used (not applicable to Balance 20L and 30) • Lowest Latency (not applicable to Balance 20L and 30) The next sections present the details of the above **Algorithms**

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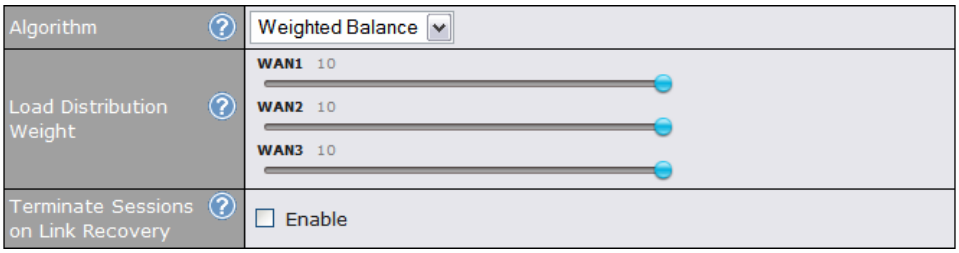
Load Distribution Settings	
Terminate Sessions on Link Recovery	This setting specifies whether to terminate existing IP sessions on a less preferred WAN connection in the event that a more preferred WAN connection is recovered from the Down health state. This setting is applicable to the Algorithms: ***Weighted***, ***Persistence*** and ***Priority***. By default, this is disabled. It means, all existing IP sessions will not be terminated or affected when any other WAN connection is recovered. If it is set to enabled, existing IP sessions may be terminated when another WAN connection is recovered such that only preferred healthy WAN connection(s) are used at any point in time.

12.2.1 Algorithm: Weighted Balance

This setting specifies the ratio of WAN connection usage to be applied on the specified IP Protocol & Port, and is applicable only when Algorithm is set to ***Weighted Balance***.



The amount of matching traffic that is distributed to a WAN connection is proportional to the weight of WAN connection relative to the total weight. Use the sliders to change each WAN's weight.

Example: With the following weight settings on a Peplink Balance 300:

- WAN1: 10
- WAN2: 10
- WAN3: 5

Total weight is 25 = (10 + 10 + 5)

Matching traffic distributed to WAN1 is 40% = (10 / 25) x 100%
Matching traffic distributed to WAN2 is 40% = (10 / 25) x 100%
Matching traffic distributed to WAN3 is 20% = (5 / 25) x 100%

12.2.2 Algorithm: Persistence

The configuration of Persistent Services is the solution to the few situations where link load distribution for Internet services is undesirable.

For example, many e-banking and other secure websites, for security reasons, terminate the session when the client computer's Internet IP address changes mid-session.

In general, different Internet IP addresses represent different computers. The security concern is that an IP address change during a session may be the result of an unauthorized intrusion attempt. Therefore, to prevent damages from the potential intrusion, the session is terminated upon the detection of an IP address change.

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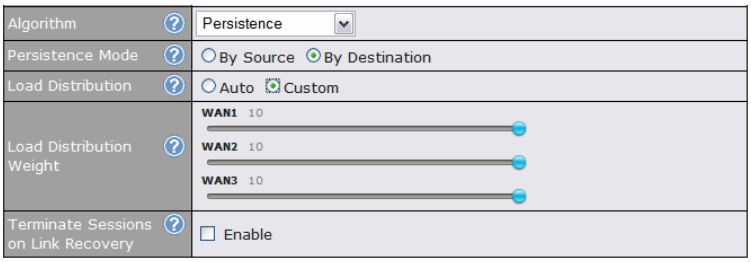
Peplink Balance can be configured to distribute data traffic across multiple WAN connections. Also, the Internet IP depends on the WAN connections over which communication actually takes place. As a result, a LAN client computer behind Peplink Balance may communicate using multiple Internet IP addresses. For example, a LAN client computer behind a Peplink Balance 300 with three WAN connections may communicate on the Internet using three different IP addresses.

With the Persistency feature of Peplink balance, rules can be configured to enable client computers to persistently utilize the same WAN connections for e-banking and other secure websites. As a result, a client computer will communicate using one IP address and eliminate the issues.



There are two Persistent Modes. One is by source and the other by destination.

By source: The traffic matching this rule will be persistently routed through the same WAN connection for the traffic from the same machine to the same destination. It provides higher application compatibility but a less even distribution of load to the WAN connections for the type of traffic.

By destination: The traffic matching this rule will be persistently routed through the same WAN connection for the traffic from any machine to the same destination. It provides a more even distribution of load to the WAN connections but also lower application compatibility.

The default Persistence Mode is by source.

When there are multiple client requests, they can be distributed (persistently) to WAN connections with a weight. If you choose "Auto" in the field "Load Distribution", the weights will be each WAN's *Downstream Bandwidth* which is specified in the WAN settings page (see section 10 Configuration of WAN Interface(s)). If you choose "Custom", you can customize the weight of each WAN manually by using the sliders.

12.2.3 Algorithm: Enforced

This setting specifies the WAN connection usage to be applied on the specified IP Protocol & Port, and is applicable only when the Algorithm is set to ***Enforced***.

Matching traffic will be routed through the specified WAN connection regardless of health check status of the WAN connection.

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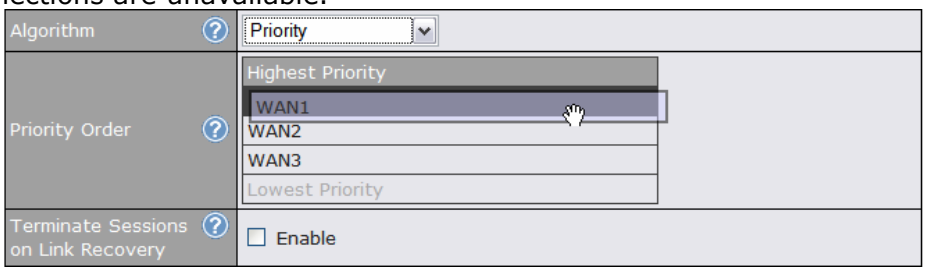
12.2.4 Algorithm: Priority

This setting specifies the priority of the WAN connections to route the specified network service. The highest priority available WAN connections will always be used for routing the specified type of traffic. A lower priority WAN connection will be used only when all higher priority connections are unavailable.



Tip

Configure multiple distribution rules to accommodate different kinds of services.

12.2.5 Algorithm: Least Used

(This section applies only to Peplink Balance 200, 300, 380, 390, 700 and 710.)

The traffic matching this rule will be routed through the healthy WAN connection with the most available downstream bandwidth. The available downstream bandwidth of a WAN connection is calculated from the total downstream bandwidth specified in the WAN settings page, and the current downstream usage. The available bandwidth and WAN selection is determined every time an IP session is made.

12.2.6 Algorithm: Lowest Latency

(This section applies only to Peplink Balance 200, 300, 380, 390, 700 and 710.)

Traffic matched this rule will be routed through the healthy WAN connection with the lowest latency. Active pings are issued periodically to a nearby router of each WAN connection. The latency of a WAN is the ping round trip time of the WAN connection.

Tip

The round trip time of a "6M down / 640k up" link can be higher than that of a "2M down / 2M up" link. It is because the overall round trip time is lengthened by its slower upstream bandwidth despite of its higher downlink speed. Therefore this algorithm is good for two scenarios:

1. all WAN connections are symmetric; or
2. a latency sensitive application requires to be routed through the lowest latency WAN regardless the WAN's available bandwidth.

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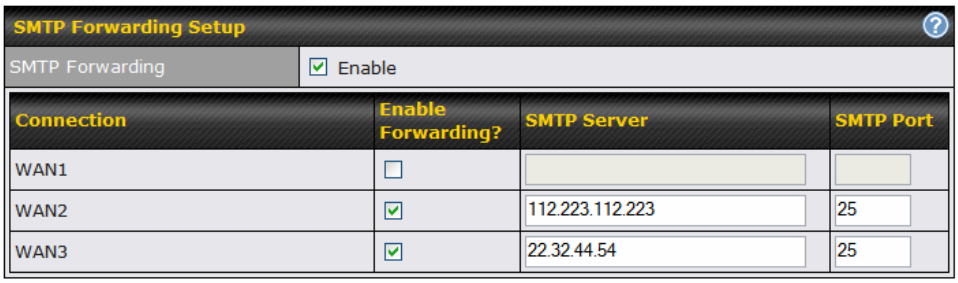
13 Service Forwarding

13.1 SMTP Forwarding

Some ISPs require their users to send e-mails via the ISP's SMTP server. All outgoing SMTP connections are blocked except those connecting to the ISP's. The Peplink Balance supports to intercept and redirect all outgoing SMTP connections (destined for TCP port 25) via a WAN connection to the WAN's corresponding SMTP server.

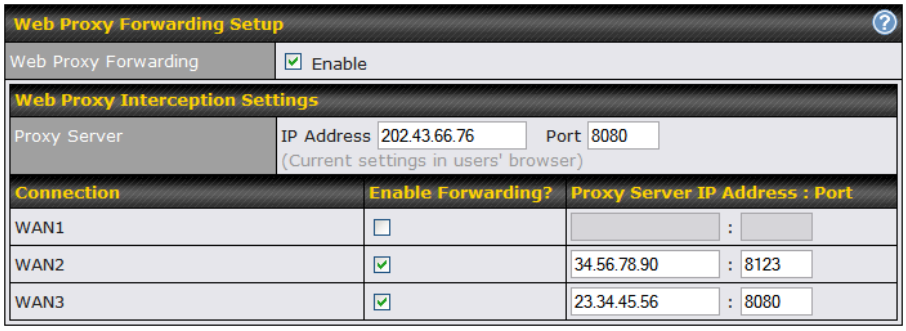


To enable the feature, check the Enable check box of the SMTP Forwarding. Check "Enable Forwarding?" for the WAN connection that needs such forwarding. Enter the ISP's e-mail server address and TCP port number for each WAN.

The Peplink Balance will intercept SMTP connections, choose a WAN with reference to the Outbound Policy, and then forward the connection to the forwarded SMTP server if the chosen WAN enabled forwarding. If the Forwarding is disabled for a WAN connection, SMTP connections for the WAN will be simply forwarded to the connection's original destination.

Note
If you want to route all SMTP connections only to particular WAN connection(s), you should create a rule in Outbound Policy (see section 12.2).

13.2 Web Proxy Forwarding



When this feature is enabled, the Peplink Balance will intercept all outgoing connections destined for the proxy server specified in "Web Proxy Server Interception Settings", choose a WAN connection with reference of Outbound Policy, and then forward them to the specified web proxy server and port number. Redirected server settings for each WAN can be set here. If Forwarding is disabled for a WAN, web proxy connections for the WAN will be simply forwarded to the connection's original destination.

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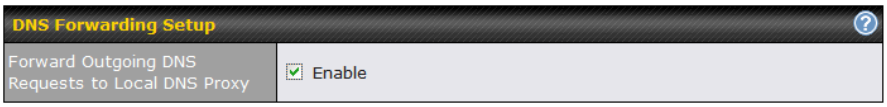
13.3 DNS Forwarding



When DNS Forwarding is enabled, all clients' outgoing DNS requests will also be intercepted and forwarded to the built-in DNS proxy server.

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14 Management of Inbound Access from WAN

When operating under NAT mode, Peplink Balance acts as a firewall that blocks, by default, all inbound access from the Internet.

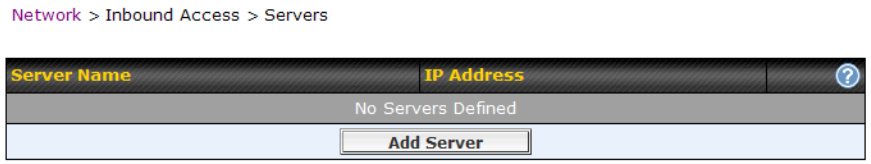
By the custom definition of servers and services for inbound access, Internet users can access the servers behind Peplink Balance. Advanced configurations allow inbound access to be distributed among multiple servers on the LAN.

Important Note
Inbound access management applies only to WAN connections that operate under NAT mode. For WAN connections that operate under drop-in mode or IP forwarding, inbound traffic is forwarded to the LAN by default.

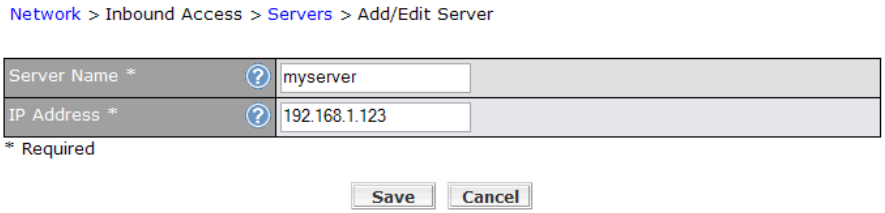
14.1 Definition of Servers on LAN

(This section applies only to Peplink Balance 200, 300, 380, 390, 700 and 710.)

The settings to configure servers on the LAN are located at the following location: ***Network > Inbound Access > Servers***:

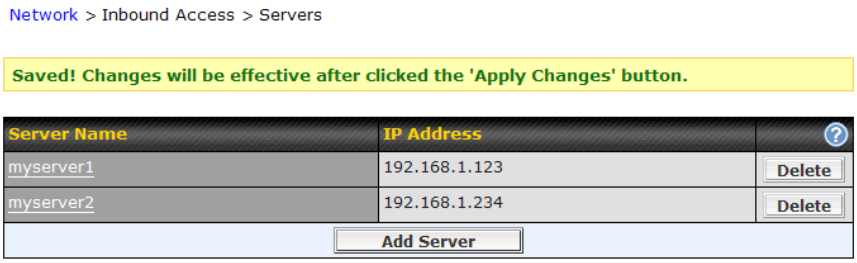


To define a new server, click ***Add Server***, upon which the following screen appears:



Enter a valid server name (consisting only of alphanumeric and the underscore "_" characters), and the corresponding LAN IP address.

Upon clicking ***Save*** after entering required information, the following screen appears.



To define additional servers, click ***Add Server*** and repeat the above steps.

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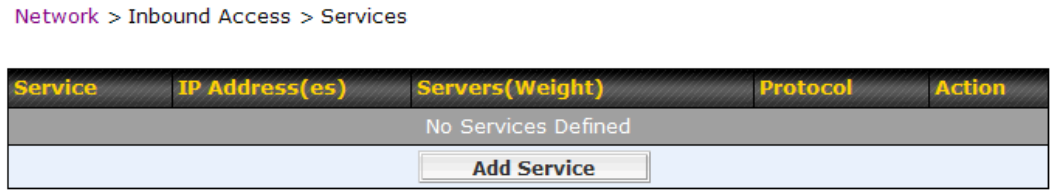
14.2 Definition of Services

(This section applies only to Peplink Balance 200, 300, 380, 390, 700 and 710.)

Services are defined at ***Network > Inbound Access > Services***:

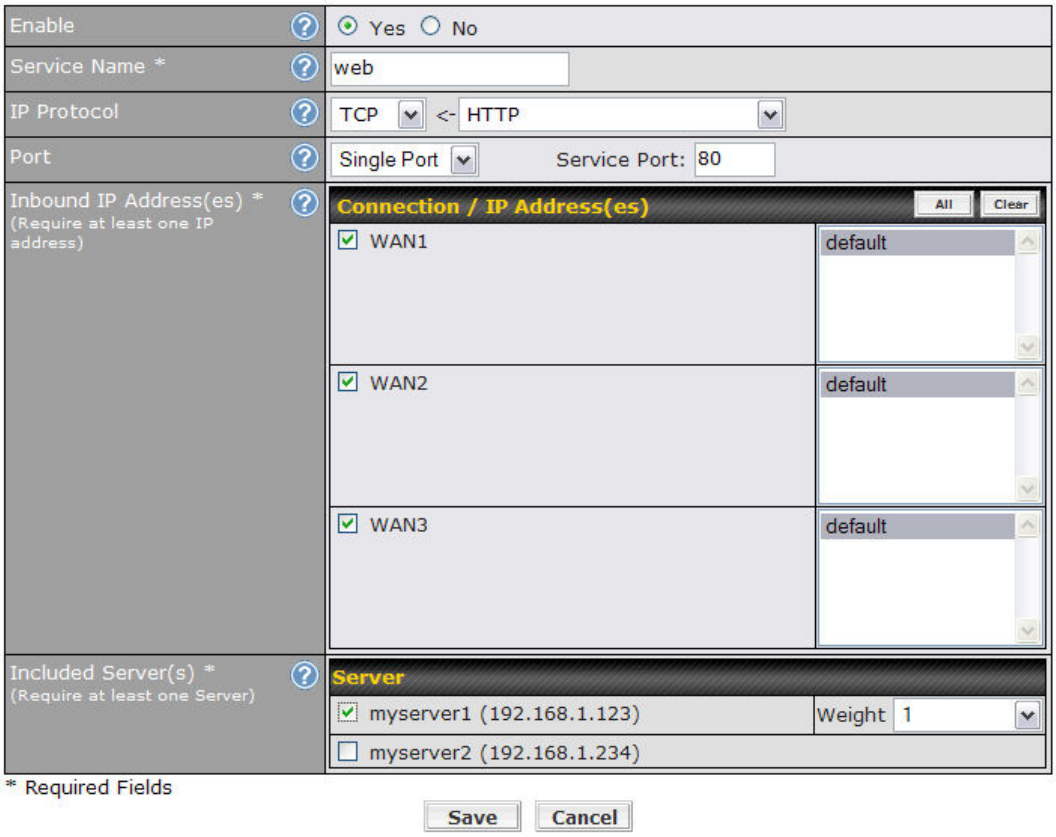


Tip

At least one server must be defined before services can be added.

Please refer to Section 14.1, **Definition of Servers on LAN**, as necessary.

To define a new service, click the ***Add Service*** button, upon which the following appears:



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Services Settings	
Enable	This setting specifies whether the Inbound Service takes effect. With an Enable value of ***Yes***, the inbound service takes effect: traffic is matched, and actions are taken, by Peplink Balance based on the other parameters of the rule. With an Enable value of ***No***, the inbound service does not take effect: Peplink Balance disregards the other parameters of the rule.
Service Name	This setting identifies the service to the System Administrator. Valid values for this setting consist only of alphanumeric and the underscore "_" characters.
IP Protocol	The IP Protocol setting, along with the Port setting, specify the protocol of the service as one of the following valid values: • TCP • UDP • ICMP • IP Traffic that is received by Peplink Balance via the specified protocol at the specified port(s) is forwarded to the LAN hosts specified by the Servers setting. (Please refer below for details on the Port and Servers settings.) Alternatively, the ***Protocol Selection Tool*** drop-down menu can be used to automatically fill in the Protocol and a single Port number of common Internet services (e.g. HTTP, HTTPS, etc.) After select an item from the ***Protocol Selection Tool*** drop-down menu, the Protocol and Port number remain manually modifiable.

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Services Settings	
Port	The Port setting specifies the port(s) that correspond to the service, and can be configured to behave in one of the following manners: • Any Port • Single Port • Port Range • Port Map **Any Port**: all traffic that is received by Peplink Balance via the specified protocol is forwarded to the servers specified by the Servers setting. For example, with IP Protocol set to ***TCP***, and Port set to ***Any Port***, all TCP traffic is forwarded to the configured servers. **Single Port**: traffic that is received by Peplink Balance via the specified protocol at the specified port is forwarded via the same port to the servers specified by the Servers setting. For example, with IP Protocol set to ***TCP***, and Port set to ***Single Port*** and ***Service Port*** 80, TCP traffic received on Port 80 is forwarded to the configured servers via Port 80. **Port Range**: traffic that is received by Peplink Balance via the specified protocol at the specified port range is forwarded via the same respective ports to the LAN hosts specified by the Servers setting. For example, with IP Protocol set to ***TCP***, and Port set to ***Single Port*** and ***Service Port*** 80-88, TCP traffic received on ports 80 through 88 is forwarded to the configured servers via the respective ports. **Port Map**: traffic that is received by Peplink Balance via the specified protocol at the specified port is forwarded via a different port to the servers specified by the Servers setting. For example, with IP Protocol set to ***TCP***, and Port set to ***Port Map***, ***Service Port*** 80, and ***Map to Port*** 88, TCP traffic on Port 80 is forwarded to the configured servers via Port 88. (Please refer below for details on the Servers setting.)
Inbound IP Address(es)	This setting specifies the WAN connections and Internet IP address(es) from which the service can be accessed.

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Services Settings	
Included Server(s)	This setting specifies the LAN servers that handle requests for the service, and the relative weight values. The amount of traffic that is distributed to a server is proportional to the weight value assigned to the server relative to the total weight. Example: With the following weight settings on a Peplink Balance: • demo_server_1: 10 • demo_server_2: 5 The total weight is 15 = (10 + 5) Matching traffic distributed to demo_server_1: 67% = (10 / 15) x 100% Matching traffic distributed to demo_server_2: 33% = (5 / 15) x 100%

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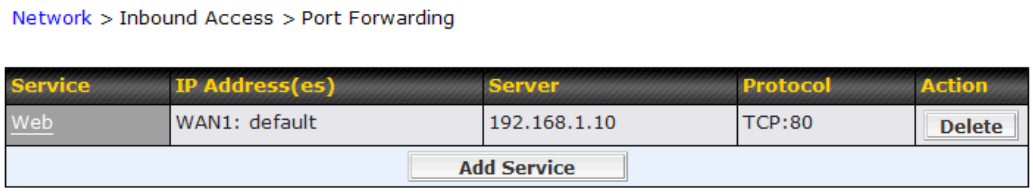
14.3 Definition of Port Forwarding

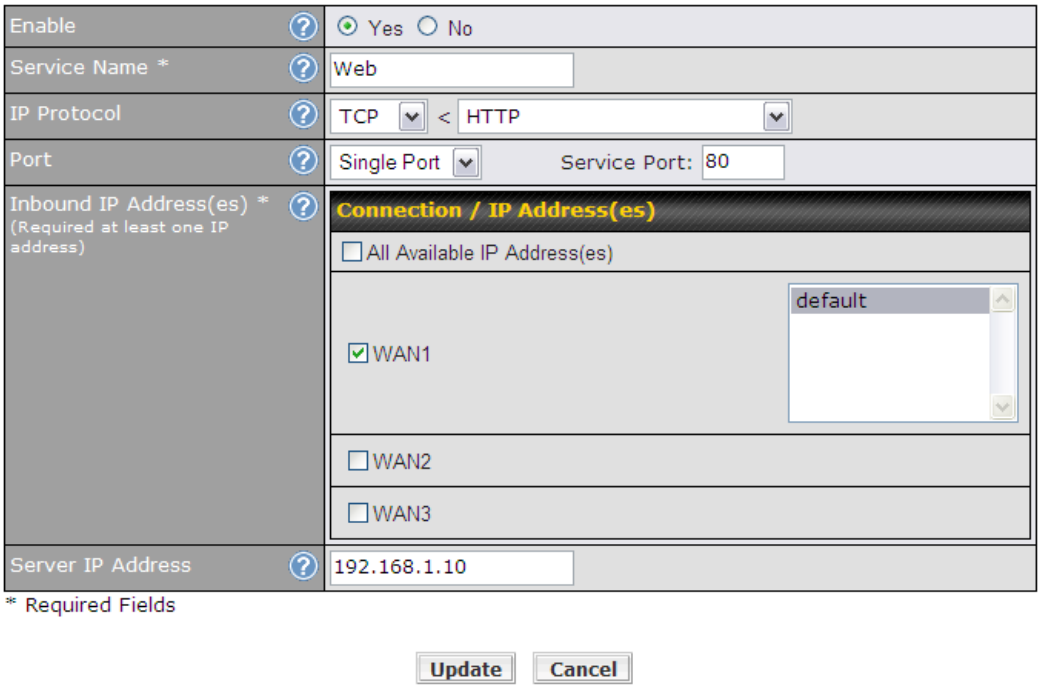
(This section applies only to Peplink Balance 20L and 30.)

Inbound Port Forwarding rules are defined at:

Network > Inbound Access > Port Forwarding:



To define a new service, click the ***Add Service*** button, upon which the following appears:



Port Forwarding Settings	
Enable	This setting specifies whether the Inbound Service takes effect. With an Enable value of ***Yes***, the inbound service takes effect: traffic is matched, and actions are taken, by Peplink Balance based on the other parameters of the rule. With an Enable value of ***No***, the inbound service does not take effect: Peplink Balance disregards the other parameters of the rule.
Service Name	This setting identifies the service to the System Administrator. Valid values for this setting consist only of alphanumeric and the underscore "_" characters.

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Port Forwarding Settings	
IP Protocol	The IP Protocol setting, along with the Port setting, specify the protocol of the service as TCP, UDP, ICMP or IP. Traffic that is received by Peplink Balance via the specified protocol at the specified port(s) is forwarded to the LAN hosts specified by the Servers setting. (Please refer below for details on the Port and Servers settings.) Alternatively, the ***Protocol Selection Tool*** drop-down menu can be used to automatically fill in the Protocol and a single Port number of common Internet services (e.g. HTTP, HTTPS, etc.) After selecting an item from the ***Protocol Selection Tool*** drop-down menu, the Protocol and Port number remains manually modifiable.
Port	The Port setting specifies the port(s) that correspond to the service, and can be configured to behave in one of the following manners: Any Port, Single Port, Port Range and Port Map **Any Port**: all traffic that is received by Peplink Balance via the specified protocol is forwarded to the servers specified by the Servers setting. For example, with IP Protocol set to ***TCP***, and Port set to ***Any Port***, all TCP traffic is forwarded to the configured servers. **Single Port**: traffic that is received by Peplink Balance via the specified protocol at the specified port is forwarded via the same port to the servers specified by the Servers setting. For example, with IP Protocol set to ***TCP***, and Port set to ***Single Port*** and ***Service Port*** 80, TCP traffic received on Port 80 is forwarded to the configured servers via Port 80. **Port Range**: traffic that is received by Peplink Balance via the specified protocol at the specified port range is forwarded via the same respective ports to the LAN hosts specified by the Servers setting. For example, with IP Protocol set to ***TCP***, and Port set to ***Single Port*** and ***Service Port*** 80-88, TCP traffic received on ports 80 through 88 is forwarded to the configured servers via the respective ports. **Port Map**: traffic that is received by Peplink Balance via the specified protocol at the specified port is forwarded via a different port to the servers specified by the Servers setting. For example, with IP Protocol set to ***TCP***, and Port set to ***Port Map***, ***Service Port*** 80, and ***Map to Port*** 88, TCP traffic on Port 80 is forwarded to the configured servers via Port 88. (Please refer below for details on the Servers setting.)
Inbound IP Address(es)	This setting specifies the WAN connections and Internet IP address(es) from which the service can be accessed.
Server IP Address	This setting specifies the LAN IP address of the server that handles the requests for the service.

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14.4 Definition of DNS Records

(This section applies only to Peplink Balance 200, 300, 380, 390, 700 and 710.)

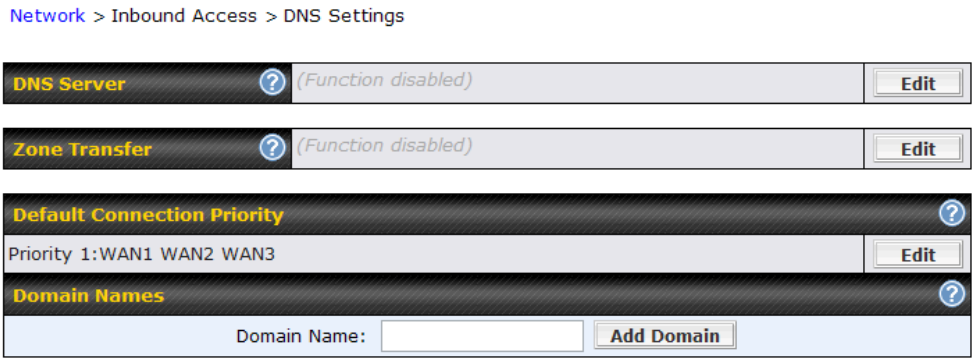
The built-in DNS Server functionality of Peplink Balance facilitates inbound load balancing. With the presence of the functionality, NS/SOA DNS records for a domain name can be delegated to Internet IP address(es) of Peplink Balance. Upon receiving a DNS query, Peplink Balance supports returning, as an "A" record, the corresponding IP address for the domain name on the most appropriate healthy WAN connection. It also supports acting as a generic DNS server for hosting "A", "CNAME", "MX", "TXT" and "NS" records.

For example:

(This example is for illustration only; the actual resolution that takes place in implementation will likely be different.)

- The DNS resolution of the domain name `www.mycompany.com` is delegated to the WAN2 Internet IP addresses of Peplink Balance.
- Upon receiving the DNS query, Peplink Balance returns, as an "A" record, the IP address for `www.mycompany.com` on WAN1 because WAN1 is the most appropriate healthy link.

The settings for defining the DNS records to be hosted by Peplink Balance are located at ***Network > Inbound Access > DNS Settings***:



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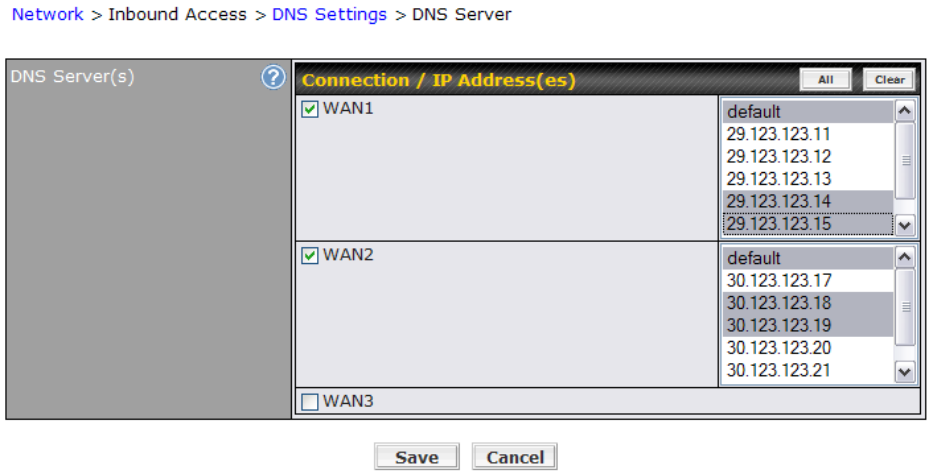
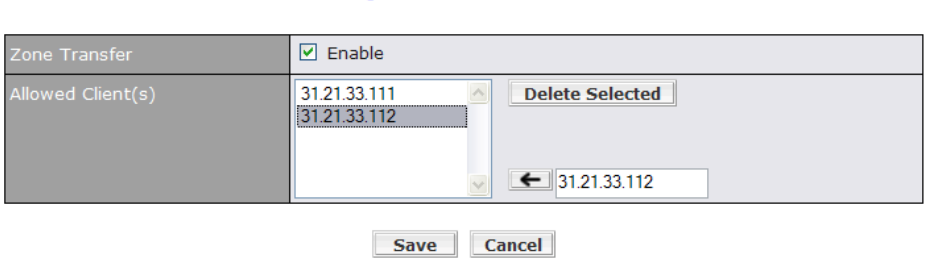
DNS Settings	
DNS Server	This setting specifies the WAN IP addresses on which the DNS server of Peplink Balance should listen. If no addresses are selected, the Inbound Link Load Balancing feature will be disabled; Peplink Balance will not respond to DNS requests. To specify and/or modify the IP addresses on which the DNS Server should listen, click the ***Edit*** button that corresponds to ***DNS Server Listens on***, and the following screen is displayed:  To specify the Internet IP addresses on which the DNS Server should listen, select the WAN connection by checking the appropriate boxes and the IP addresses associated with the WAN connections by highlighting the appropriate items in the list. (Multiple items in the list can be selected by holding CTRL and clicking on the items.) Click ***Save*** to save the settings when configuration is complete.
Zone Transfer	This setting specifies the IP address(es) of secondary DNS server(s) that are to be allowed to retrieve zone records from the DNS server of Peplink Balance. The zone transfer server of Peplink Balance listens on TCP Port 53.  Peplink Balance serves both the clients that are accessing from the specified IP addresses, and the clients that are accessing from the LAN Interface (of the Peplink Balance unit).

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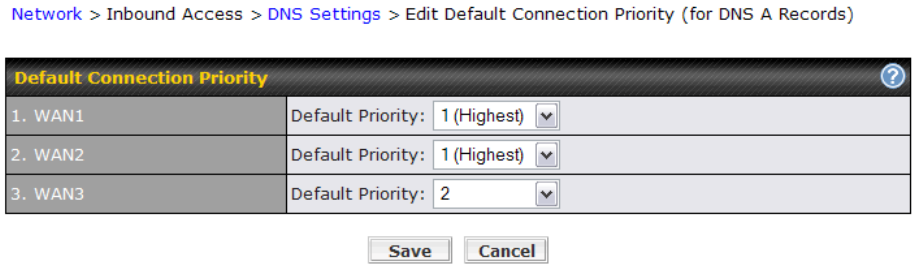
<table>
<tr><th colspan="2">DNS Settings</th></tr>
<tr><td>Default Connection Priority</td><td>Default Connection Priority defines the default priority group of each WAN connection in resolving A records. It applies to A records which have the Connection Priority set to "Default". Please refer to section 14.4.5 for the details.

The WAN connection(s) with the highest priority (smallest number) will be chosen. Those with lower priorities will not be chosen in resolving A records unless the higher priority ones become unavailable.

To specify the Primary and Backup connections, click the Edit button that corresponds to Default Connection Priority. The screen should assemble the one below.

Each WAN connection is associated with a priority number. Click Save to save the settings when configuration is complete.</td></tr>
<tr><td>Domain name</td><td>This section shows a list of domain names to be hosted by the Peplink Balance. Each domain can have its “NS”, “MX” and “TXT” records, and its or its sub-domains’ “A” and “CNAME” records.

Input the domain name into the “Domain Name” field and click the Add Domain button to add a new one. Click on a domain name to edit. Click the Delete button on the right of a domain name to delete.</td></tr>
</table>

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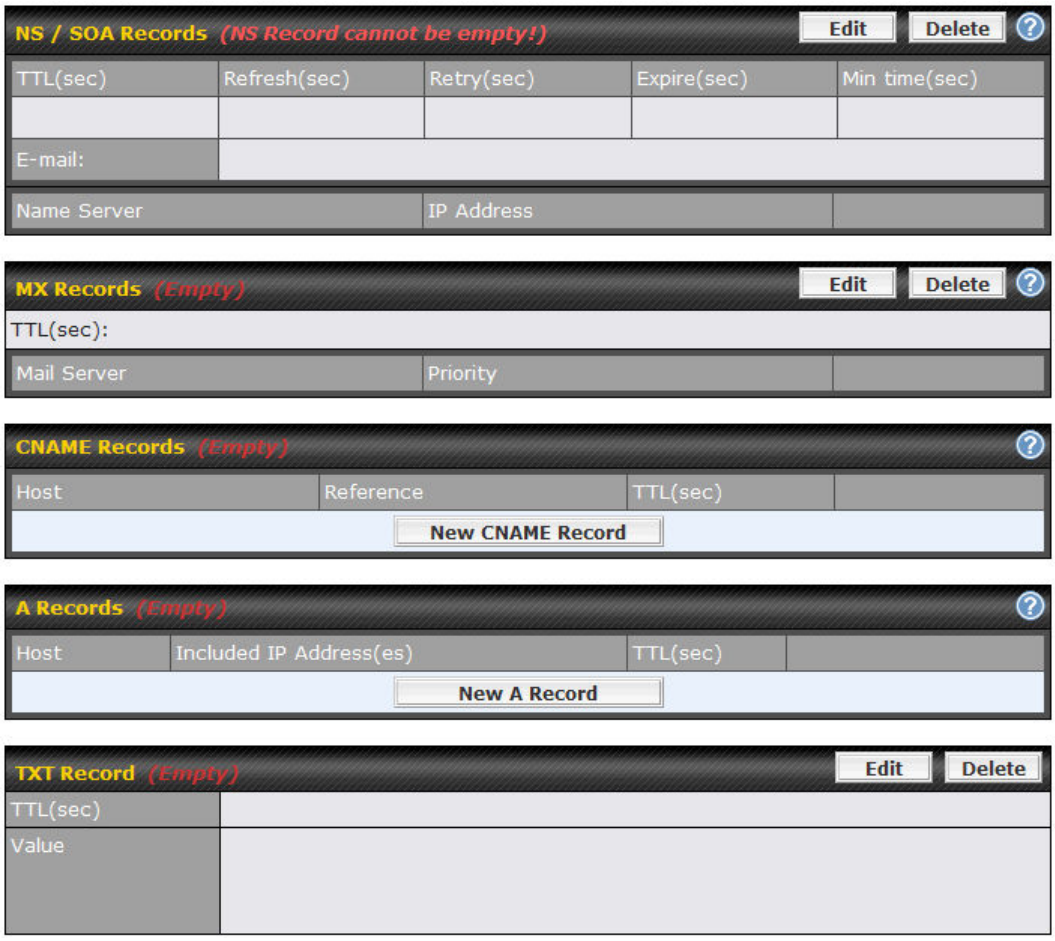
14.4.1 Creating DNS Records

To create new DNS records for a domain, perform the following steps:

From **Network -> Inbound Access -> DNS Settings**, enter a domain name in the Domain Name field, click the ***Add Domain*** button. Then click on the newly created domain name and the following screen is displayed:



This page is for defining the domain's NS, MX, CNAME, A and TXT records. Five tables are presented in this page for defining the five types of records.

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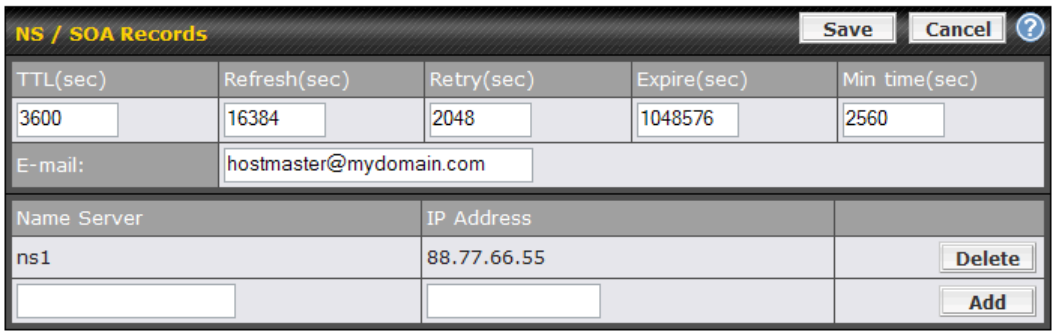
14.4.2 NS / SOA Record

The NS / SOA Record table shows the NS servers, A records, TTL, Refresh Time, Retry Time, Expire Time, Minimum Time, and E-mail contact address, that correspond to the domain.

To add or edit an NS record, click the upper ***Edit*** button in the **NS Record** box. Then the table will expand to look like the following:



The first two rows are the settings of TTL, Refresh Time, Retry Time, Expiry Time, Minimum Time and E-mail:

- **TTL (Time-to-Live)**: Defines the duration in seconds that the record may be cached
- **Refresh**: Indicates the time when the slave will try to refresh the zone from the master.
- **Retry**: Defines the time between retries if the slave (secondary) fails to contact the master when *refresh* (above) has expired.
- **Expire**: Indicates when the zone data is no longer authoritative.
- **Min Time**: Negative caching time – the time an error record is cached
- **E-mail**: Defines the E-mail address of the person responsible for this zone. Note: the "@" sign in the E-mail address field will be converted into a dot (".") in returning the SOA record.

You can enter a name server host name and its IP address into the two newly created text boxes. The host name can be a non-FQDN (fully qualified domain name). Click the ***Add*** button on the right to finish and to add the other one. After finished adding NS records, click the ***Save*** button. (Before clicking the ***Save*** button, all NS record changes are not yet saved to the Peplink Balance.)

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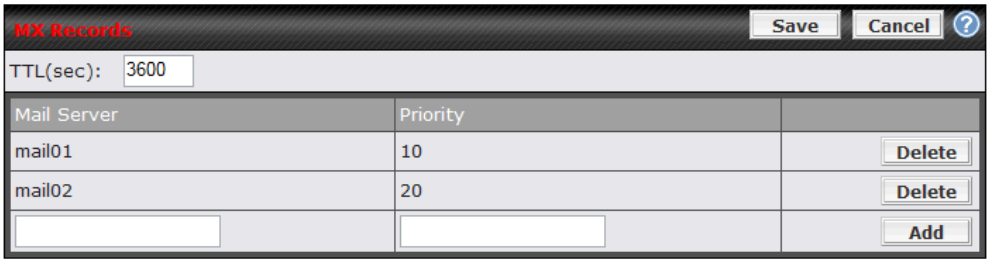
14.4.3 MX Record

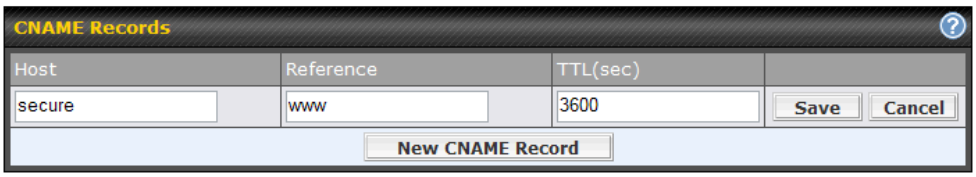
The MX Record table shows the domain's MX records. Each MX record contains the priority and mail exchange server host name.



For each record, **Priority** and **Host** name must be entered. **Priority** typically ranges from 10 to 100. Smaller numbers have a higher a priority. After finishing adding MX records, click the ***Save*** button.

14.4.4 CNAME Record

The CNAME Record table shows the domain's CNAME records. Here is how you use CNAME Records - If you want a sub-domain "secure" to have the same A record value(s) as "www", then you can create a CNAME record for "secure" and reference it to "www".

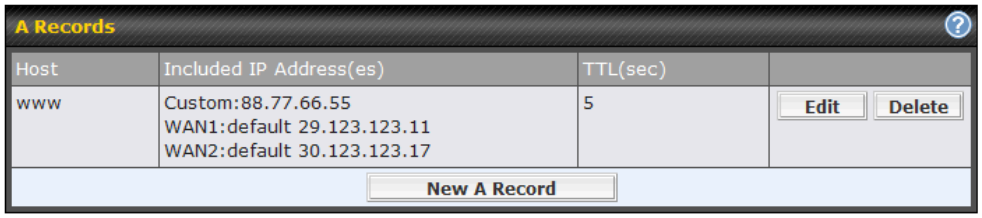


The wildcard character "*" is supported in the Host field. The Reference of "*.*domain.name*" will be returned for every name ending with ".*domain.name*" except names that have their own records.

The **TTL** field tells the time to live of the record in external DNS caches.

14.4.5 A Record

This table shows the A records of the domain name.



To add an A record, click the ***Add A Record*** button. The screen resembles the one below:

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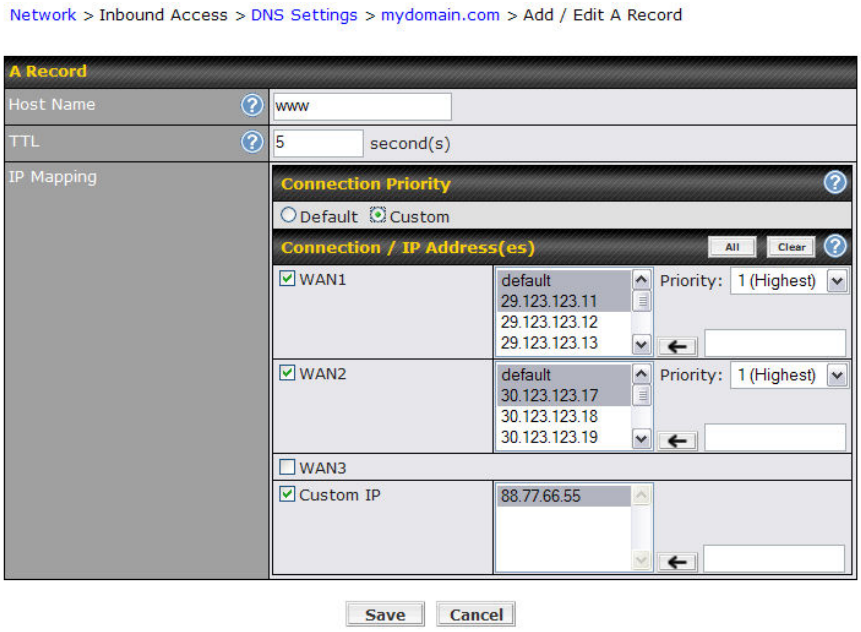

A Record Editing	
Host Name	This field specifies the A record of this sub-domain to be served by the Peplink Balance. The wildcard character "*" is supported. The IP addresses of "*.*domain.name*" will be returned for every name ending with ".*domain.name*" except names that have their own records.
TTL	This setting specifies the time to live of this record in external DNS caches. In order to reflect any dynamic changes on the IP addresses in case of link failure and recovery, this value should be set to a smaller value. E.g. 5 secs, 60 secs, etc.

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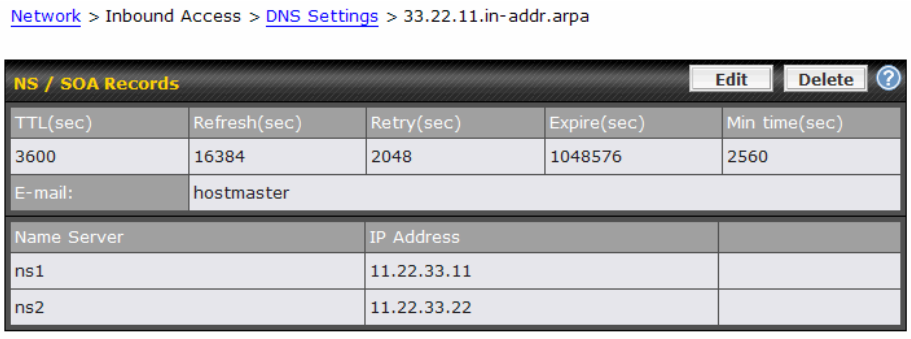
A Record Editing	
IP Mapping	This setting specifies lists of WAN-specific Internet IP addresses that are candidates to be returned when Peplink Balance responds to DNS queries for the domain name specified by Host Name. The IP addresses listed in each box as **Default** are the Internet IP addresses associated with each of the WAN connections. Static IP addresses that are not associated with any WAN can be entered into the Custom IP list. A PTR record is also created for each Custom IP's. For WAN connections that operate under Drop-in mode, there may be other routable IP addresses in addition to the **Default** IP address. Therefore, Peplink Balance allows custom Internet IP addresses to be added manually via filling the text box on the right-hand side and clicking the Left Arrow button. Only the highlighted IP addresses in the lists are candidates to be returned when responding to a DNS query. (Multiple items in a list can be selected by holding CTRL and clicking on the items.) In case of a WAN connection is down, the corresponding set of IP addresses will not be returned. However, the IP addresses in the Custom IP field will always be returned. If the Connection Priority field is set to Custom, you can also specify the priority of the use of each WAN connection. Only selected IP address(es) of available connection(s) with the highest priority, and also Custom IP addresses will be returned. By default, the Connection Priority is set to "Default".

14.4.6 PTR Record

PTR records are created along with A records pointing to Custom IPs. Please refer to section 14.4.5 for details. For example, if you created an A record `www.mydomain.com` pointing to `11.22.33.44`, then a PTR record `44.33.22.11.in-addr.arpa` pointing to `www.mydomain.com` will also be created.

In order to have the PTR records working, you will also have to create NS records for the PTR records. For example, if the IP address range `11.22.33.0` to `11.22.33.255` is delegated to the DNS server on the Peplink Balance, you will also have to create a domain `33.22.11.in-addr.arpa` and have its NS records pointing to your DNS server's (the PePWave Balance) public IP addresses.



With the above records created, the PTR record creation is complete.

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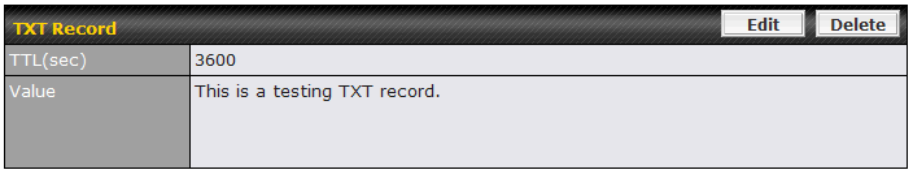
14.4.7 TXT Record

This table shows the TXT record of the domain name.



Click the ***Edit*** button to edit the record. The time-to-live value and the TXT record's value can be entered. Click the Save button to finish.

After completing editing the five types of record, you can click the link ***DNS Settings*** to leave the page.

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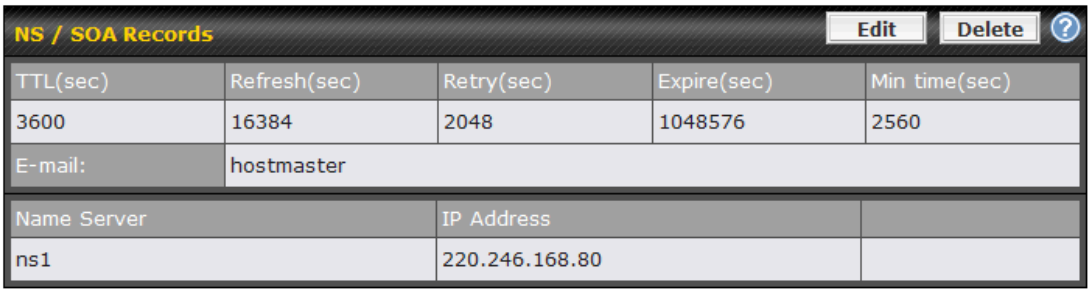
DNS Registration and Hosting

Domain Delegation

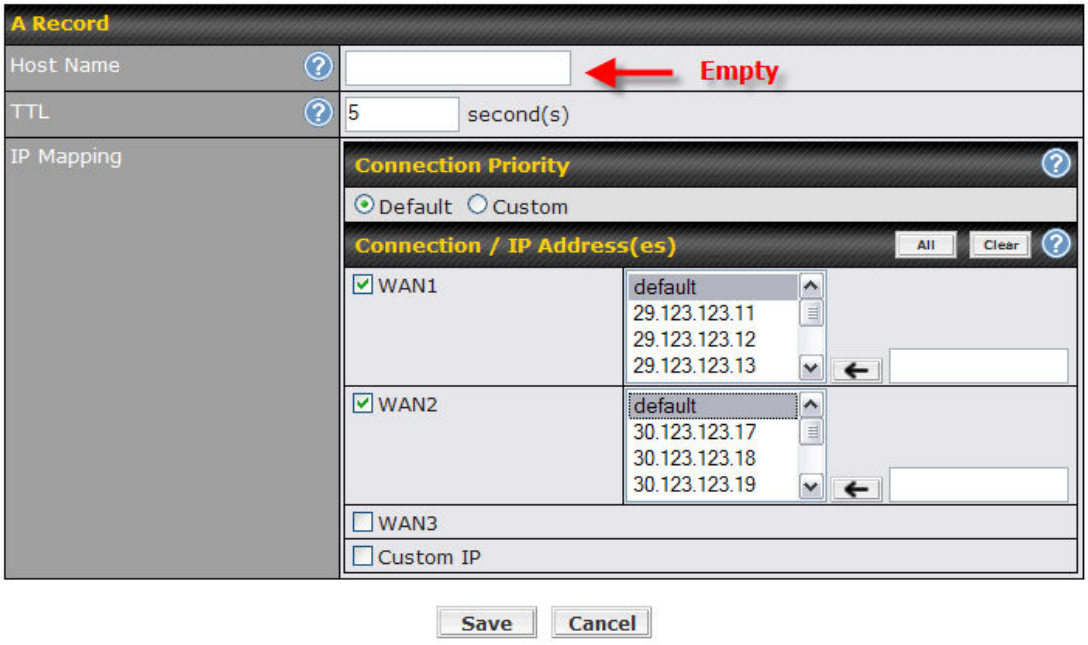
These are the steps to be used when you host your domain at your ISP or a domain registrar and want to delegate a sub-domain to be resolved and managed at Peplink Balance.

1. Create a domain, e.g. "www.mycompany.com"

2. Create NS records named "ns1", "ns2", etc. The IP addresses are the Balance's DNS server addresses.



3. Then create an A record with an empty host name:



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If ISC BIND 8 or 9 is being utilized in the zone file `mycompany.com`, then the addition of the following lines suffice:

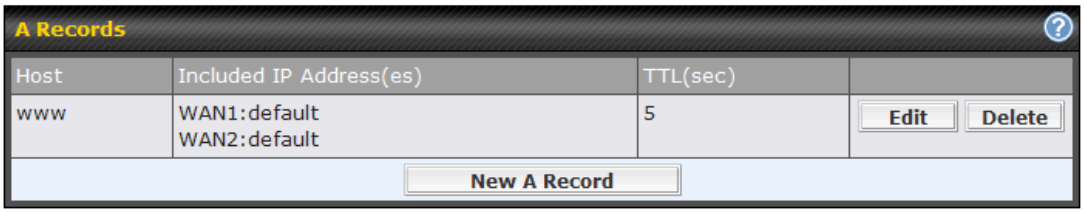
```
www                IN    NS    balancewan1
www                IN    NS    balancewan2
balancewan1        IN    A     202.153.122.108
balancewan2        IN    A     67.38.212.18
```

202.153.122.108 and 67.38.212.18 represent the WAN1 and WAN2 Internet IP addresses of Peplink Balance, respectively. The values of the IP addresses are fictitious and for illustration only; the actual IP addresses in implementation will likely be different.

Hosting the complete domain at Peplink Balance

To host your own DNS server, contact the DNS registrar to have the NS records of the domain (e.g. "mycompany.com") point to your Balance's WAN IP addresses. Then follow these instructions:

1. Under **Network > Inbound Access > DNS Settings**, create a new domain, for example "`mycompany.com`".
2. Create NS records named "`ns1`", "`ns2`", etc. The IP addresses are the Balance's DNS server addresses (same as above).
3. Create the corresponding A, CNAME, MX and TXT records as you wish. The A record resembles the one below:



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Testing the DNS Configuration

The following steps can be used to test the DNS configuration:

From a host on the Internet, use an IP address of Peplink Balance and nslookup to lookup the corresponding hostname.

Check the information that is returned for the expected results.

An example with nslookup in Windows follows:

```
C:\Documents and Settings\User Name>nslookup
Default Server:  ns1.myisp.com
Address:  147.22.11.2

> server 202.153.122.108  (This is Peplink Balance's WAN IP address.)
Default Server:  balance.mycompany.com
Address:  202.153.122.108

> www.mycompany.com       (This is the hostname to look up.)
Default Server:  balance.mycompany.com
Address:  202.153.122.108

Name:    www.mycompany.com
Address:  202.153.122.109, 67.38.212.19
```

The values of the IP addresses are fictitious and for illustration only; the actual IP addresses in implementation will likely be different.

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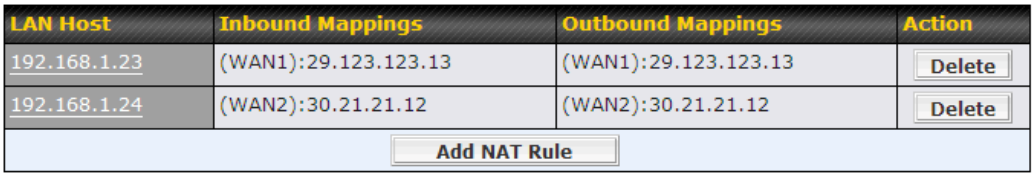
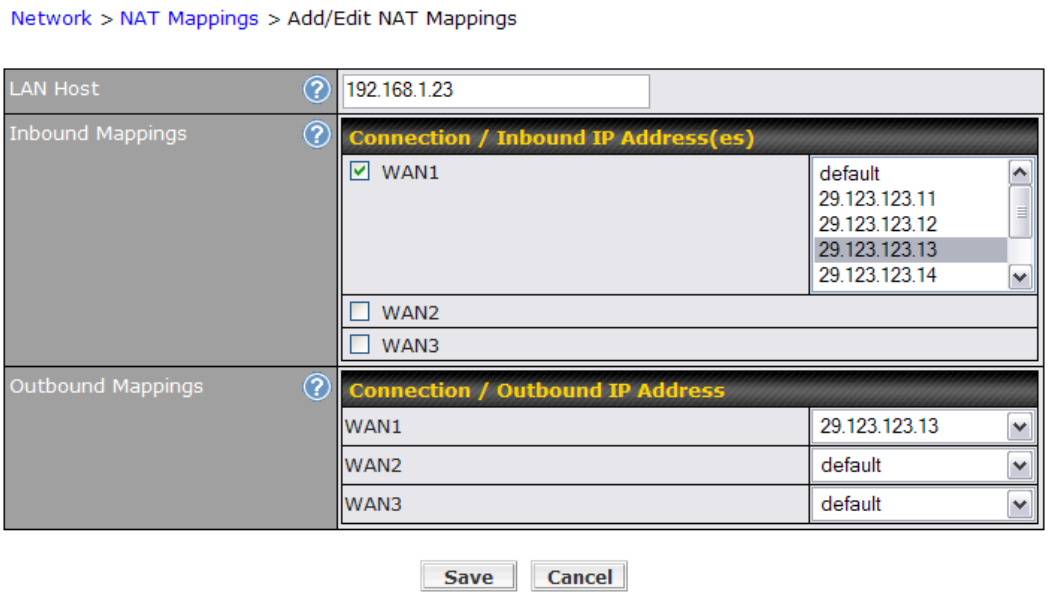
15 Configuration of NAT Mappings

This configuration replaces "DMZ" in firmware versions prior to 3.8. The configuration of NAT Mappings allows the IP address mapping of all inbound and outbound NAT'ed traffic to and from an internal client IP address.

The settings to configure NAT Mappings are located at ***Network > NAT Mappings***:



To add a NAT Mapping, click ***Add NAT Rule***, upon which the following screen is displayed:



NAT Mapping Settings	
LAN Host	This is the IP address of the host on the LAN that the system should map the selected connection IP address correspondences.
Inbound Mappings	This setting specifies the WAN connections and corresponding WAN-specific Internet IP addresses on which the system should bind on. Any access to the specified WAN connection(s) and IP address(es) will be forwarded to the LAN Host. Note 1: Inbound Mapping is not needed for WAN connections in drop-in or IP forwarding mode. Note 2: Each WAN IP address can be associated to one NAT Mapping only.

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Outbound Mappings	This setting specifies the IP address of each WAN connection to be used for any outgoing traffic originating from the LAN Host. Note 1: If you do not want to use a specific WAN for outgoing accesses, you should still choose "default" here, then customize the outbound access rule in the "Outbound Traffic Management" section. Note 2: WAN connections in drop-in or IP forwarding mode are not shown here.

Click ***Save*** to save the settings when configuration is complete.

Important Note
Inbound firewall rules override Inbound Mapping settings.

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16 Firewall Configuration

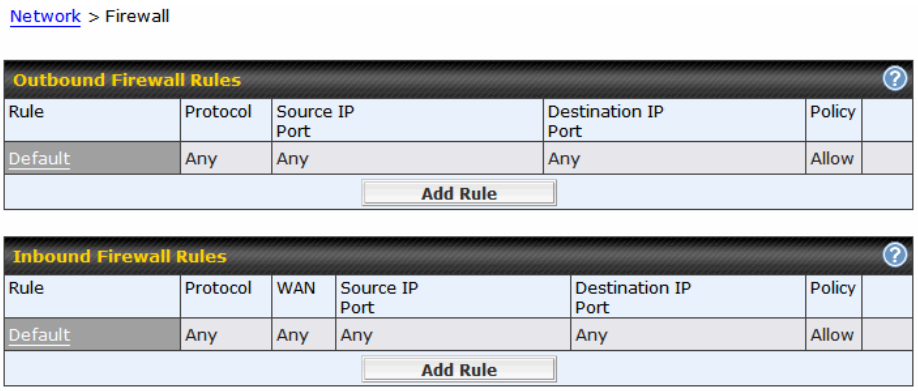
A firewall is a mechanism that selectively filters data traffic between the WAN side (the Internet) and the LAN side of the network. It can protect the local network from potential hacker attacks, offensive Web sites, and/or other inappropriate uses.

The firewall functionality of Peplink Balance supports the selective filtering of data traffic in both directions:

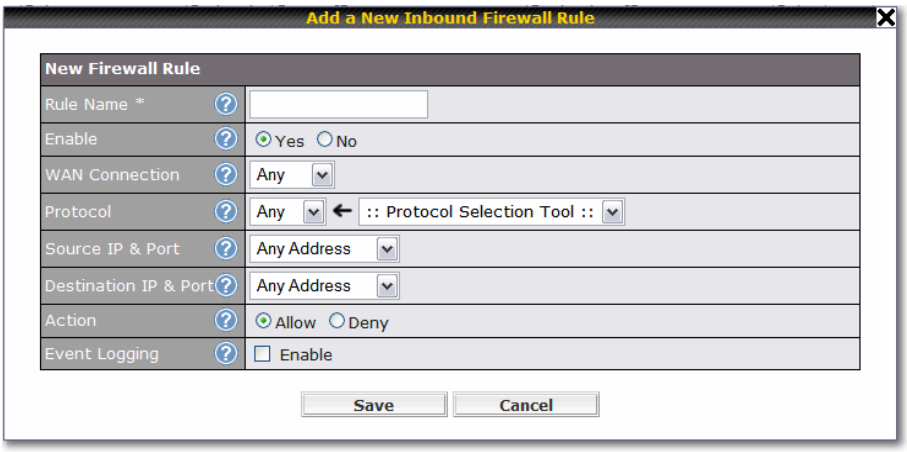
- Outbound (LAN to WAN)
- Inbound (WAN to LAN)
- Intrusion Detection and DoS Prevention

16.1 Outbound and Inbound Firewall

The outbound and inbound firewall settings are located in ***Network > Firewall***:



Upon clicking ***Add Rule***, the following screen appears:



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Inbound / Outbound Firewall Settings	
Rule Name	This setting specifies a name for the firewall rule.
Enable	This setting specifies whether the firewall rule should take effect. With an Enable value of ***Yes***, the firewall rule takes effect: traffic is matched, and actions are taken, by Peplink Balance based on the other parameters of the rule. With an Enable value of ***No***, the firewall rule does not take effect: Peplink Balance disregards the other parameters of the rule.
WAN Connection	(Applicable to Inbound Firewall only) This setting specifies the WAN connection(s) on which the rule applies: • Any • WAN1 • WAN2 • WAN3 (applicable only to Peplink Balance 30, 300, 380, 390, 700 and 710) • WAN4 to WAN7 (applicable only to Peplink Balance 700 and 710) A value of ***Any***, ***WAN1***, ***WAN2***, … and ***WAN7*** specifies that the rule applies to all WAN connections, WAN1, WAN2, … and WAN7, respectively.
Protocol	This setting specifies the protocol to be matched. Via a drop-down menu, the following protocols can be specified: • TCP • UDP • ICMP • IP Alternatively, the ***Protocol Selection Tool*** drop-down menu can be used to automatically fill in the Protocol and Port number of common Internet services (e.g. HTTP, HTTPS, etc.) After selecting an item from the ***Protocol Selection Tool*** drop-down menu, the Protocol and Port number remains manually modifiable.

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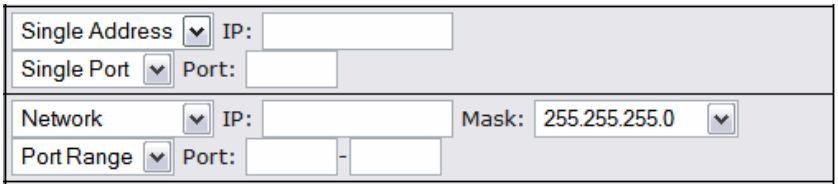
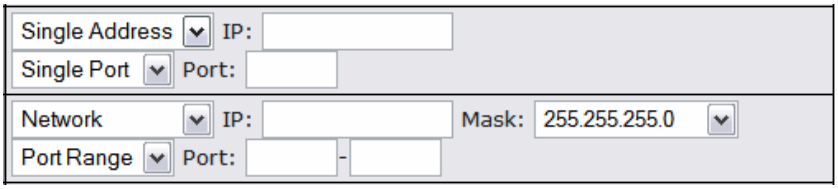
Inbound / Outbound Firewall Settings	
Event Logging	This setting specifies whether or not to log matched firewall events. The logged messages are shown on the page ***Status > Logs***: A sample message is as follows: `Aug 13 23:47:44 Denied CONN=WAN1 SRC=20.3.2.1 DST=192.168.1.20 LEN=48 PROTO=TCP SPT=2260 DPT=80` • ***CONN***: The connection to which the log entry refers. Possible values are `LAN` and `WANx`, where `x` is the WAN number. • ***SRC***: Source IP address • ***DST***: Destination IP address • ***LEN***: Packet length • ***PROTO***: Protocol • ***SPT***: Source port • ***DPT***: Destination port
Source IP & Port	This specifies the source IP address(es) and port number(s) to be matched for a firewall rule. A single address, or a network, can be specified as the Source IP & Port setting, as indicated with the following screenshots:  In addition, a single port, or a range of ports, can be specified for the Source IP & Port setting.
Destination IP & Port	This specifies the destination IP address(es) and port number(s) to be matched for a firewall rule. A single address, or a network, can be specified as the Source IP & Port setting, as indicated with the following screenshots:  In addition, a single port, or a range of ports, can be specified for the Source IP & Port setting.

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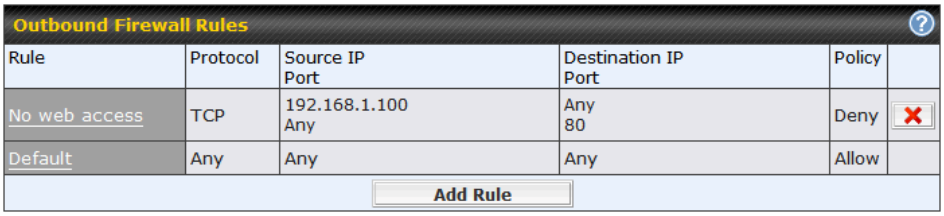
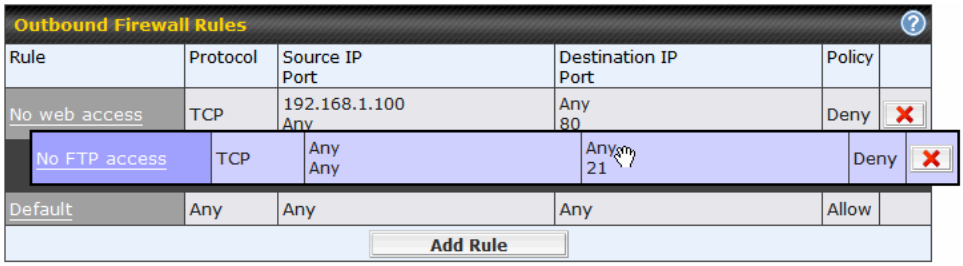
Inbound / Outbound Firewall Settings	
Action	This setting specifies the action to be taken by Peplink Balance upon encountering traffic that matches the both of the following: • Source IP & Port • Destination IP & Port With the value of ***Allow*** for the Action setting, the matching traffic passes through Peplink Balance (to be routed to the destination). If the value of the Action setting is set to ***Deny***, the matching traffic does not pass through Peplink Balance (and is discarded).

Upon clicking ***Save*** after entering required information, the following screen appears.



To create an additional firewall rule, click ***Add Rule*** and repeat the above steps.

To reorder a rule's position, just drag on the rule by holding the left mouse button, move it to the desired position and drop it by releasing the mouse button.



To remove a rule, click .

Rules are matched from top to the bottom. If a connection matched any one of the upper rules, the matching will stop. If none of the rules is matched, the "Default" rule will be applied.

By default, the Default rule is "Allow" for both outbound and inbound accesses.

Tip
If the default inbound rule is "Allow", for NAT enabled WANs, no inbound "Allow" firewall rules will be required for inbound "Services" and inbound NAT Mapping rules. However, if the default inbound rule is "Deny", corresponding "Allow" firewall rules will be required.

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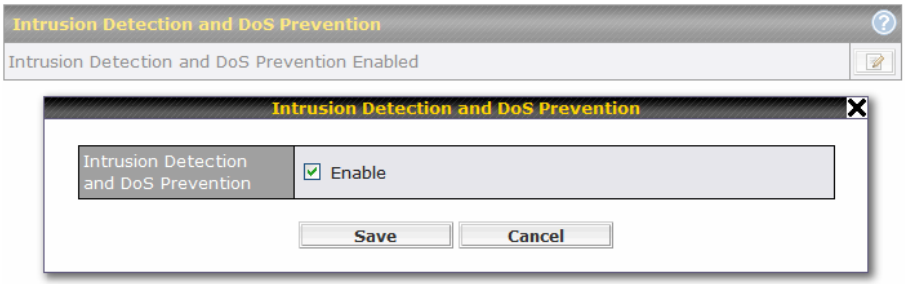
16.2 Intrusion Detection and DoS Prevention



The Balance supports detecting and preventing intrusions and Denial-of-Service (DoS) attacks from the Internet. To turn on this feature, click , check the "Enable" check box for the Intrusion Detection and DoS Prevention and press the Save button.

When this feature is enabled, the Balance will detect and protect from the following kinds of intrusions and denial-of-service attacks.

Port Scan:

- NMAP FIN/URG/PSH
- Xmas Tree
- Another Xmas Tree
- Null Scan
- SYN/RST
- SYN/FIN

SYN Flood Prevention

Ping Flood Attack Prevention

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17 Miscellaneous Settings

(This section applies only to Peplink Balance 200, 300, 380, 390, 700 and 710.)

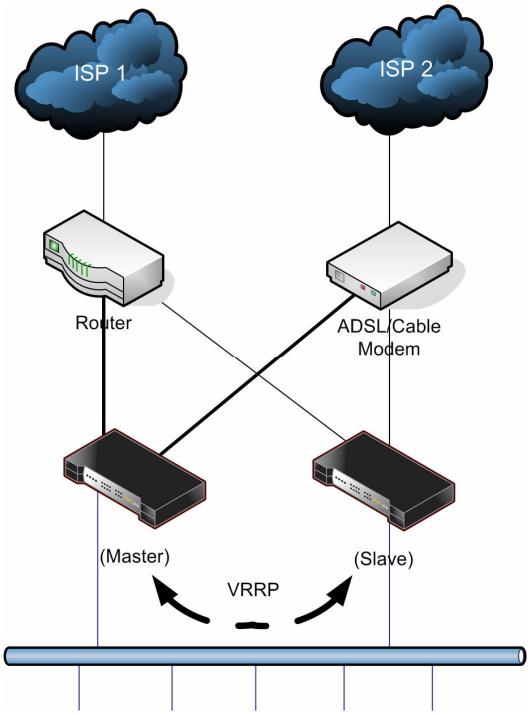
The miscellaneous settings include configuration for high availability, quality of service, time server, SNMP, email notification, and remote system log.

17.1 High Availability

Peplink Balance supports High Availability (HA) configurations via an open standard Virtual Router Redundancy Protocol (VRRP, RFC 3768).

In an HA configuration, two same-model Peplink Balance units (i.e. a pair of Peplink Balance 200 units, or a pair of Peplink Balance 300 units) provide redundancy and failover in a master-slave arrangement. From a high level, in the event that the Master Unit is down, the Slave Unit becomes active.

The following diagram illustrates an HA configuration with two Peplink Balance 200 units, and two Internet connections:



In the diagram, the WAN ports on each Peplink Balance unit connect to the router and modem; and Peplink Balance unit connects to the same LAN switch via a LAN port.

An elaboration on the technical details of the implementation, by Peplink Balance, of Virtual Router Redundancy Protocol (VRRP, RFC 3768) follows:

- In an HA configuration, the two Peplink Balance units communicate with each other using VRRP over the LAN.
- The two Peplink Balance units broadcast heartbeat signals to the LAN at a frequency of one heartbeat signal per second.
- In the event that no heartbeat signal from the Master Peplink Balance unit is

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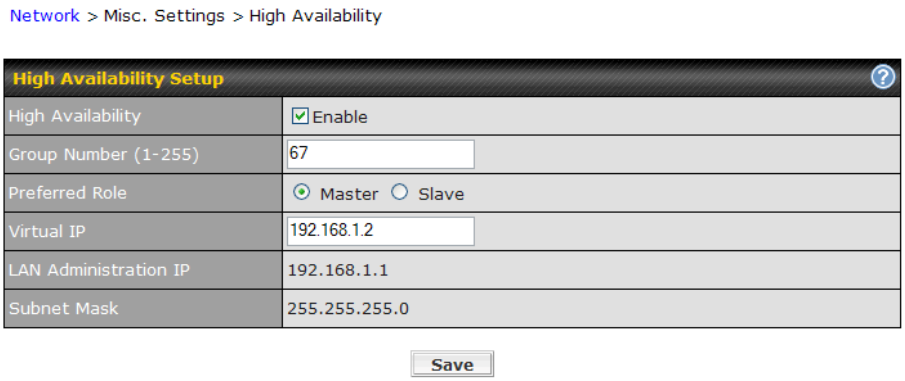
received in 3 seconds (or longer) since the last heartbeat signal, the Slave Peplink Balance unit becomes active.

- The Slave Peplink Balance unit initiates the WAN connections, and binds to a previously configured LAN IP address.
- At a subsequent point when the Master Peplink Balance unit recovers, it will once again become active.

The settings to configure High Availability are located at the following location: ***Network > Misc. Settings > High Availability***:



High Availability Settings	
High Availability	Checking this box specifies that the Peplink Balance unit is part of a High Availability configuration.
Group Number	This setting specifies a number that identifies a pair of Peplink Balance units that operate in a High Availability configuration. The two Peplink Balance units in the pair must have the same Group Number value.
Preferred Role	This setting specifies whether the Peplink Balance unit operates in Master or Slave mode. Click the corresponding radio button to set the role of the unit. One of the units in the pair must be configured as the Master and the other unit must be configured as the Slave
Virtual IP	The setting specifies the LAN IP address on which the active Peplink Balance listens. The value of Virtual IP represents a LAN IP address that is shared among the Master and Slave units; however, at any time, only one of the two units will listen on the IP address. The Default Gateway of the clients on the LAN should be set to the virtual IP value.
LAN Administration IP	This setting specifies a LAN IP address to be used for accessing administration functionality. This address should be unique within the LAN.
Subnet Mask	This setting specifies the subnet mask of the LAN.

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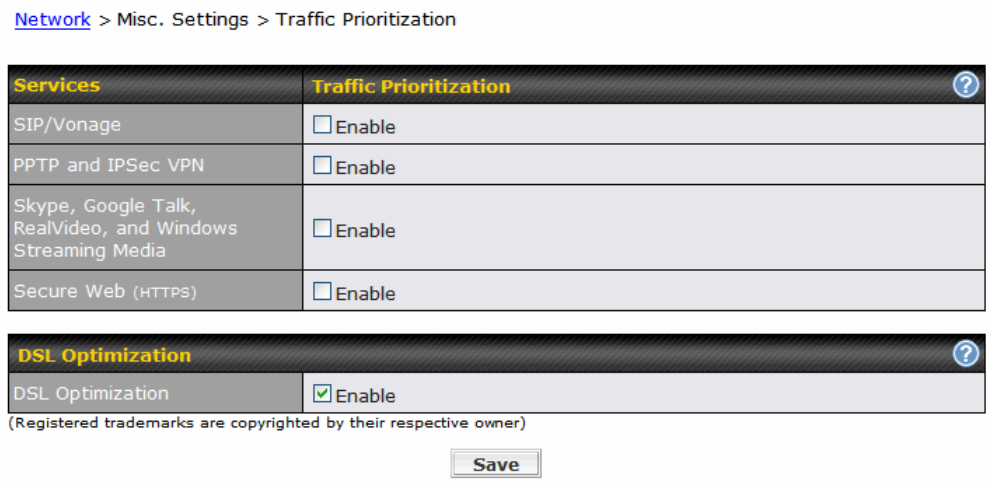
Important Note
Under HA mode, Dynamic DNS is not supported. During a fail-over or fail-back, the active Peplink Balance does not perform Dynamic DNS updates. As a result, the resolved addresses may not be the IP address of the active Peplink Balance unit.

17.2 Traffic Prioritization

(This section applies only to Peplink Balance 200, 300, 380, 390, 700 and 710.)

Peplink Balance provides the functionality to prioritize Voice over IP, VPN, video streaming, Secure Web over the other Internet traffic.

The settings for configuring Quality of Service are located at the following location: ***Network > Misc. Settings > Traffic Prioritization***:



Traffic Prioritization	
SIP/Vonage	When enabled, any SIP and Vonage voice traffic will be prioritized.
PPTP and IPSec VPN	When enabled, any PPTP and IPSec traffic will be prioritized
Skype, Google Talk, RealVideo, and Windows Streaming Media	When enabled, voice and video traffic of Skype, Google Talk, RealVideo and Windows Streaming Media will be prioritized. *(Registered trademarks are copyrighted by their respective owner)*
Secure Web (HTTPS)	When enabled, HTTPS (TCP port 443) traffic will be prioritized.

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DSL/Cable Optimization	
DSL/Cable Optimization	For an asymmetric DSL (ADSL) or cable based WAN connection, where the upstream bandwidth is lower than the downstream, with this option turned on, the WAN's downstream bandwidth can be fully utilized in any situation. When a DSL/cable circuit's uplink becomes busy, it is a fact that the downlink bandwidth is affected. Users cannot download data in full speed until the uplink becomes less congested. The DSL/Cable Optimization could relieve such problem. When it is enabled, the download speed will be less affected by upload traffic. Default: Enabled.

Please note that the Peplink Balance prioritizes only outbound packets. E.g. for secure web prioritization, the system will prioritize uploading traffic for outgoing connections and downloading traffic for incoming connections.

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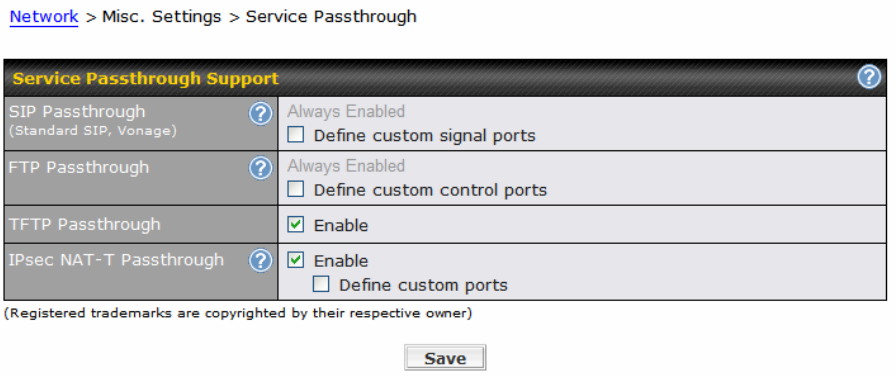
17.3 Service Passthrough

Service Passthrough settings can be found from ***Network > Misc. Settings > Service Passthrough***:



Some Internet services required to be specially handled in a multi-WAN environment. The Peplink Balance supports handling such services correctly such that Internet applications do not notice it is behind a multi-WAN router. Settings for Service Passthrough Support is available here.

Service Passthrough Support	
SIP Passthrough	Session Initiation Protocol, aka SIP, is a voice-over-IP protocol. Peplink Balance can act as a SIP Application Layer Gateway (ALG) which binds connections for the same SIP session to the same WAN connection and translate IP address in the SIP packets correctly in NAT mode. Such passthrough support is always enabled. If your SIP server's signal port number is non-standard, you can check the "Define custom signal ports" and input the port numbers to the text boxes.
FTP Passthrough	FTP sessions consist of two TCP connections. One for control and one for data. In multi-WAN situation, they have to be binded to the same WAN connection. Otherwise, problems will arise in transferring files. By default, the Peplink Balance monitors TCP control connections on port 21 for any FTP connections and binds TCP connections of the same FTP session to the same WAN. If you have an FTP server listening on a port number other than 21, you can check the "Define custom control ports" and enter the port numbers to the text boxes.
TFTP Passthrough	The Peplink Balance monitors outgoing TFTP connections and routes any incoming TFTP data packets back to the client. Select Enable if you want to enable the TFTP passthrough support.
IPsec NAT-T Passthrough	This field is for enabling the support of IPsec NAT-T passthrough. UDP ports 500, 4500 and 10000 are monitored by default. You may add more custom data ports that your IPsec system uses.

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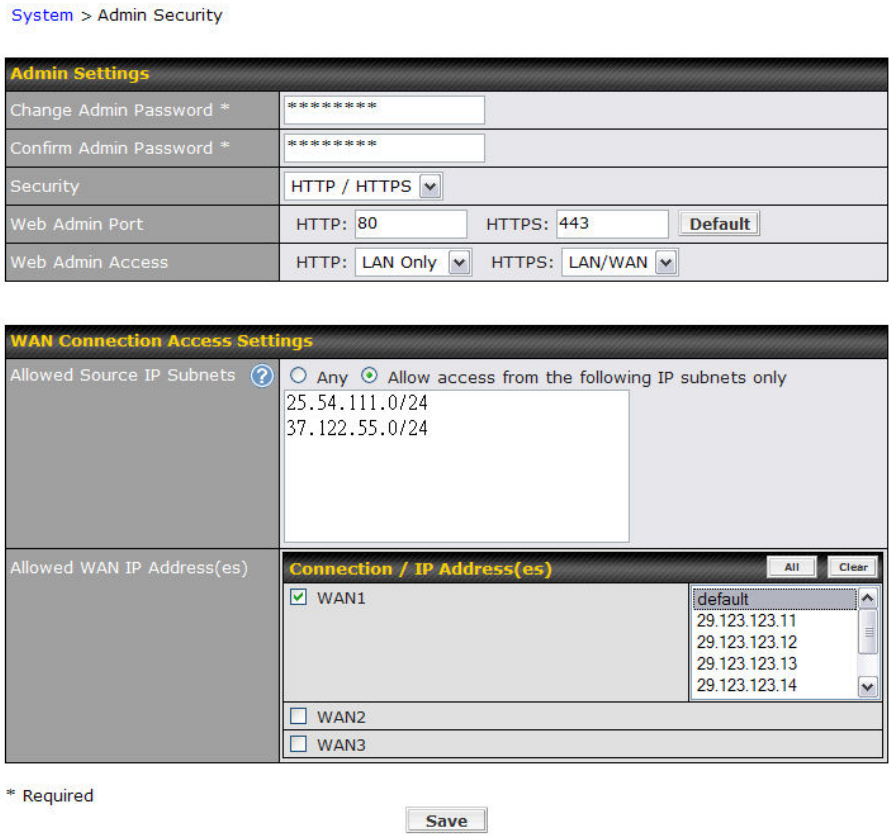
18 System Settings

18.1 Admin Security

For security reasons, after logging in to the administration interface at the first time, changing the administrator password is recommended.

Configuring the administration interface to be accessible only from the LAN can further improve system security.

Administrative Settings configuration is located at ***System > Admin Security***:



Admin Settings	
Change Admin Password	This setting specifies a new administrator password.
Confirm Admin Password	This setting verifies and confirms the new administrator password.
Security	This setting specifies the protocol(s) through which the Web Administration Interface is accessible: • HTTP • HTTPS • HTTP/HTTPS
Web Admin Port	This setting specifies the port number at which the Web Administration Interface is accessible.

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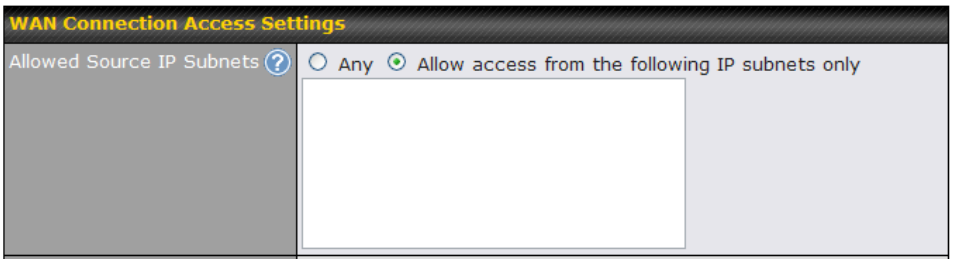
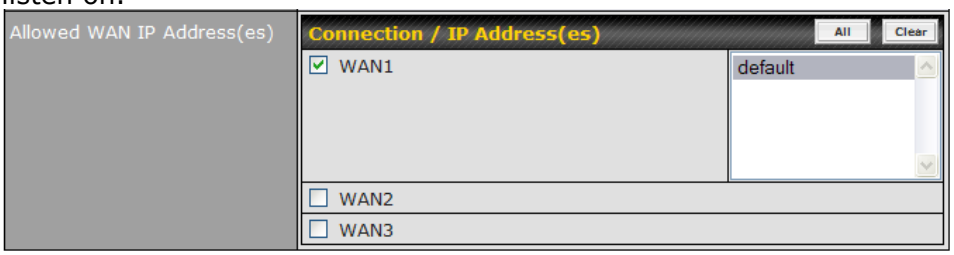
Web Admin Access	This setting specifies the network interfaces through which the Web Administration Interface can be accessed: • LAN only • LAN and WAN If ***LAN and WAN*** is chosen, a ***WAN Connection Access Settings*** form will be displayed.

WAN Connection Access Settings	

Allowed Source IP	Allowed Source IP Subnets(s): To restrict web admin access only from defined IP subnets.
	
	Any
	Allow web admin accesses to be from anywhere, without IP address restriction.
	
	Allow access from the following IP subnets only
	Restrict web admin access only from the defined IP subnets. When this is chosen, a text input area will be displayed beneath:
	
	 
	
	The allowed IP subnet addresses should be entered into this text area. Each IP subnet must be in form of `n.n.n.n/m`,
	
	where `n.n.n.n` is an IP address (e.g. `192.168.0.0`), and
	m is the subnet mask in CIDR format, which is between 0 and 32 inclusively. For example: `192.168.0.0/24`
	
	To define multiple subnets, separate each IP subnet one in a line. For example:
	`192.168.0.0/24`
	`10.8.0.0/16`

Allowed WAN IP Addresses	This is to choose which WAN IP address(es) the web server should listen on. 

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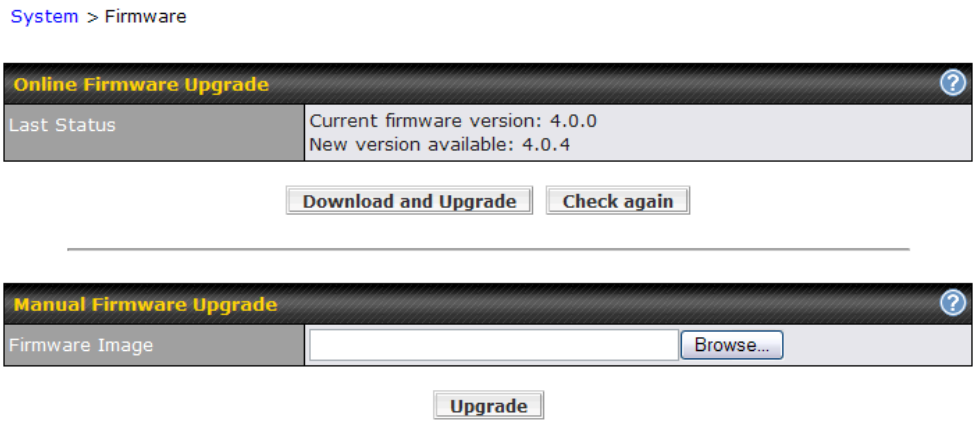
18.2 Firmware Upgrade

The firmware of Peplink Balance is upgradeable through Web Administration Interface.

Firmware upgrade functionality is located at ***System > Firmware***:



There are two ways to upgrade the unit. The first method is online firmware upgrade. The system can check, download and upgrade over the Internet. The second method is to upload a firmware file manually.

Click on the ***Check for firmware*** button to use online upgrade. With online upgrade, Peplink Balance checks online for new firmware; if new firmware is available, the firmware is automatically downloaded by Peplink Balance. The upgrade process will subsequently be automatically initiated.

You may also download a firmware image from the Peplink web site (http://www.peplink.com) and update the unit manually. Click ***Browse*** to select the firmware file from the local computer, then click ***Upload*** to send the firmware to Peplink Balance. Peplink Balance will then automatically initiate the firmware upgrade process.

Firmware Upgrade Status for Peplink Balance 20L, 30, 200 and 300

Status LED Information during firmware upgrade:

- OFF – Firmware upgrade in progress (DO NOT disconnect power.)
- Red – Unit is rebooting
- Green – Firmware upgrade successfully completed

Important Note

The firmware upgrade process may not necessarily preserve the previous configuration, and the behavior varies on a case-by-case basis. Consult the Release Notes for the particular firmware version.

Do not disconnect the power during firmware upgrade process.

Do not attempt to upload a non-firmware file, or a firmware file that is not qualified, or not supported, by Peplink.

Upgrading a Peplink Balance unit with an invalid firmware file will damage the unit, and may void the warranty.

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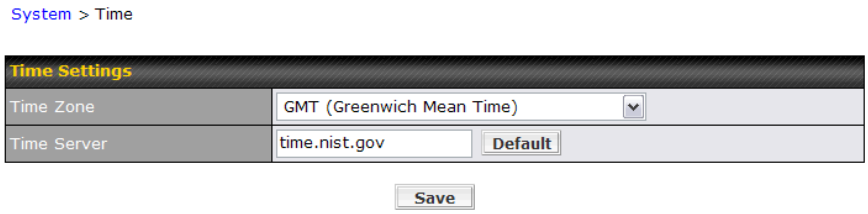
18.3 Time

The Time Server functionality enables the system clock of Peplink Balance to be synchronized with a specified Time Server.

The settings for Time Server configuration are located at the following location: ***System > Time***:



Time Server Settings	
Time Zone	This specifies the time zone (along with the corresponding Daylight Savings Time scheme) in which Peplink Balance operates. The Time Zone value affects the time stamps in the system logs of Peplink Balance and E-mail notifications.
Time Server	This setting specifies the NTP network time server to be utilized by Peplink Balance.

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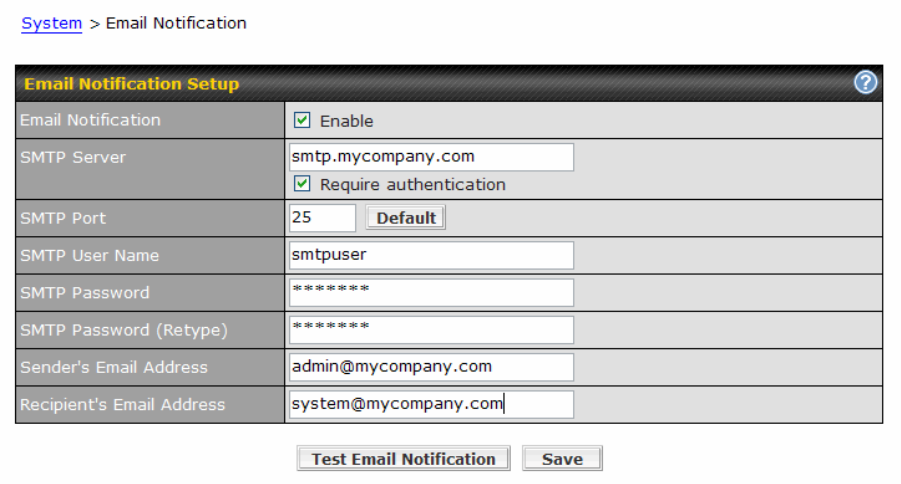
18.4 Email Notification

The Email Notification functionality of Peplink Balance provides a System Administrator with up-to-date information on network status.

The settings for configuring Email Notification are found at the following location: ***System > Email Notification***:



Email Notification Settings	
Email Notification	This setting specifies whether or not to enable Email Notification. If Email Notification is set to ***enable***, Peplink Balance sends email messages to a System Administrator when the WAN status changes, or when new firmware is available. If ***disable*** is set, Peplink Balance does not send email messages.
SMTP Server	This setting specifies the SMTP server to be used for sending email. If the Server requires authentication, check the "Require authentication" check box.
SMTP User Name / Password	This setting specifies the SMTP username and password while sending email. These options are shown only if the "Require authentication" check box is checked in SMTP Server setting.
Sender's Email Address	This setting specifies the sender email address reported by the email messages sent by Peplink Balance.
Recipient's Email Address	This setting specifies the email address to which Peplink Balance should send the email messages.

After you have completed the settings, you can click the "Test Email Notification" button to test the settings before saving it. After it is click, you will see this screen to confirm the settings:

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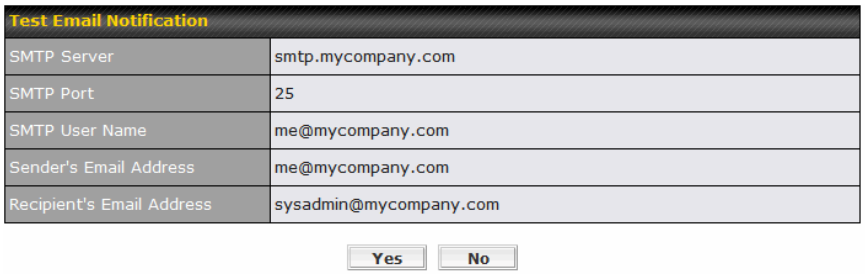
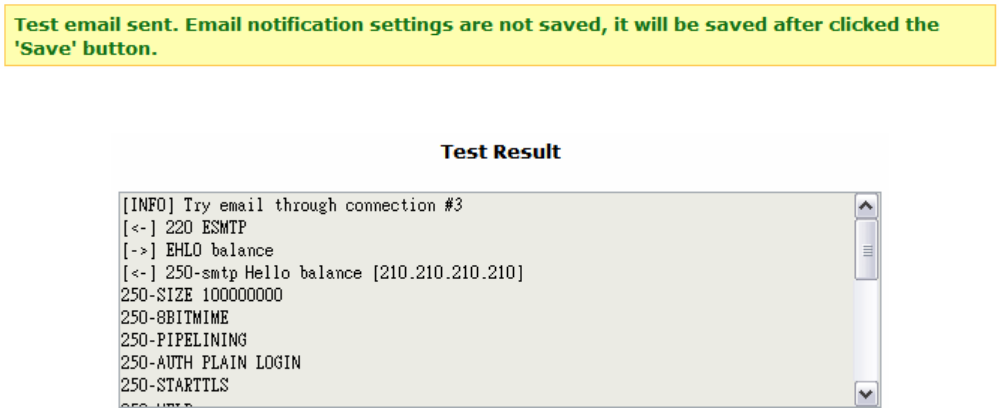


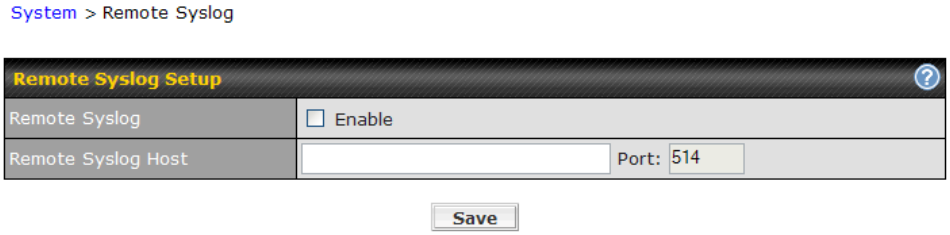
Click "Yes" to confirm. Wait a few seconds. You will see a returned message and the detailed test result.


Test email sent. Email notification settings are not saved, it will be saved after clicked the 'Save' button.
Test Result
[INFO] Try email through connection #3
[<-] 220 ESMTP
[->] EHLO balance
[<-] 250-smtp Hello balance [210.210.210.210]
250-SIZE 100000000
250-8BITMIME
250-PIPELINING
250-AUTH PLAIN LOGIN
250-STARTTLS

18.5 Remote Syslog

The Remote Syslog functionality of Peplink Balance enables event logging at a specified remote Syslog server.

The settings for configuring Remote System Log are found at the following location: ***System > Remote Syslog***:



Remote Syslog Settings	
Remote Syslog	This setting specifies whether or not to log events at the specified remote Syslog server.
Remote Syslog Host	This setting specifies the IP address or hostname of the remote Syslog server.
Port	This setting specifies the port number of the remote Syslog service. By default, the Port setting has value is 514.

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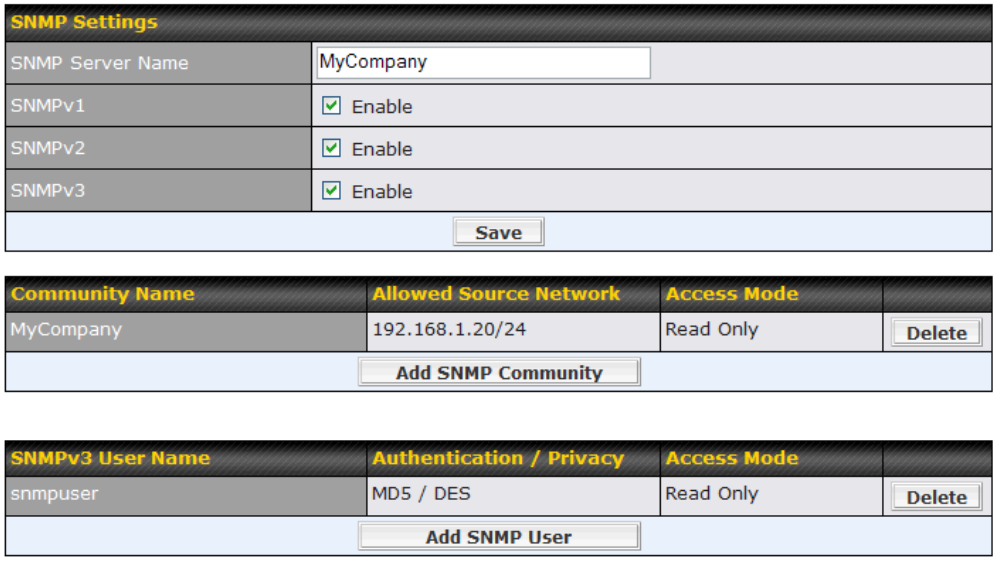
18.6 SNMP

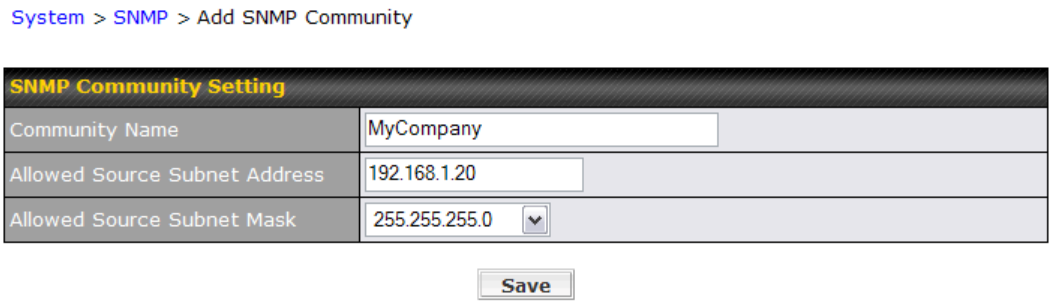
SNMP, or Simple Network Management Protocol, is an open standard that can be used to collect information about the Peplink Balance unit.

SNMP configuration is located at ***System > SNMP***:



SNMP Settings	
SNMP Server Name	This setting specifies the SNMP server name.
SNMPv1	This setting specifies that SNMP version 1 is to be enabled.
SNMPv2c	This setting specifies that SNMP version 2 is to be enabled.
SNMPv3	This setting specifies that SNMP version 3 is to be enabled.

To add a community for either SNMPv1 or SNMPv2c, click the ***Add SNMP Community*** button in the ***Community Name*** table, upon which the following screen is displayed:



SNMP Community Settings	
Community Name	This setting specifies the SNMP Community Name.

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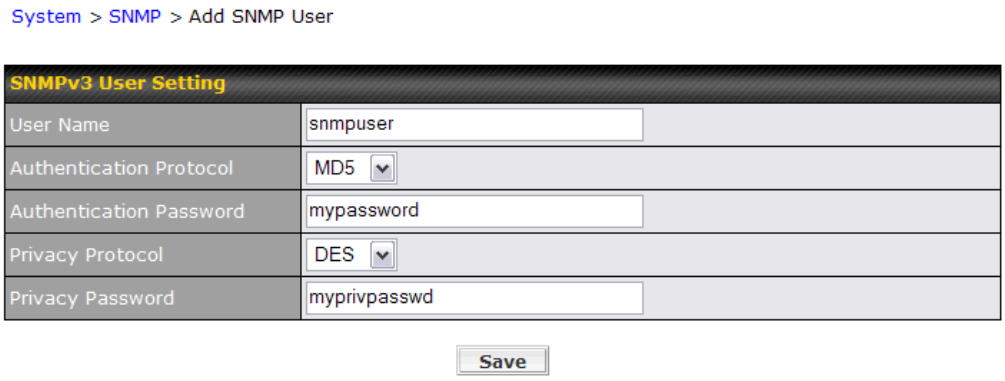
SNMP Community Settings	
Allowed Source Subnet Address	This setting specifies a subnet from which access to the SNMP server is allowed. Enter subnet address here (e.g. `192.168.1.0`).
Source Subnet Mask	This setting specifies the subnet mask that corresponds to the subnet specified via Allowed Source Subnet Address (e.g. `255.255.255.0`).

To define a user name for SNMPv3, click ***Add SNMP User*** in the ***SNMPv3 User Name*** table, upon which the following screen is displayed:



SNMPv3 User Settings	
User Name	This setting specifies a user name to be used in SNMPv3.
Authentication Protocol	This setting specifies via a drop-down menu the one of the following valid authentication protocols: • NONE • MD5 • SHA
Authentication Password	This setting specifies the authentication password, and is applicable only if the MD5 or SHA authentication protocol is selected.
Privacy Protocol	This setting specifies via a drop-down menu the one of the following valid privacy protocols: • NONE • DES
Privacy Password	This setting specifies the privacy password, and is applicable only if the DES privacy protocol is selected.

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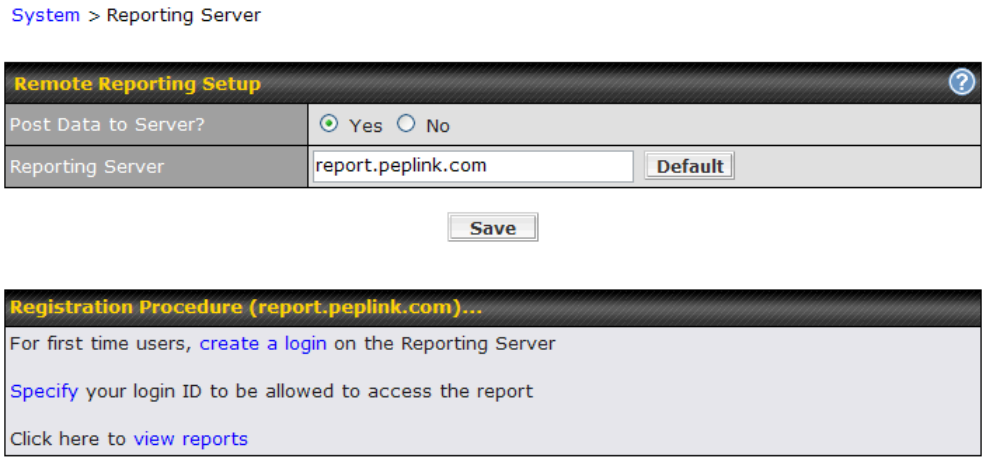
18.7 Reporting Server

The Reporting functionality enables Peplink Balance to post traffic data and other information periodically to a Peplink's Reporting Server for generating detailed historical usage reports of the device.

The settings for configuring Reporting Server functionality are found at the following location: ***System > Reporting Server***:



Remote Reporting Settings	
Post Data to Server	This setting specifies whether or not Peplink Balance should periodically and automatically post traffic data to reporting server.
Reporting Server	This setting specifies the Internet IP address or hostname of the reporting server. By default, the Reporting Server value is report.Peplink.com.
"create a login"	Click the link to register a login ID on Peplink's Reporting Server. Each login ID can associate with multiple Peplink Balance devices. If you already have a login ID on the server, you can skip this step.

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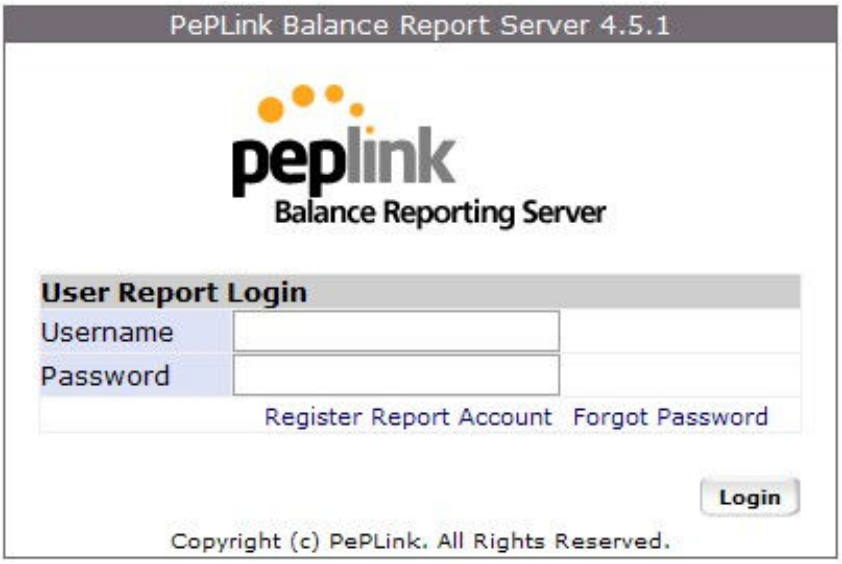
"Specify"	Click on the link and the following window will pop up: Fill in the "User Account" field to specify the login ID on the Reporting Server to be allowed to access the report of this Peplink Balance device.
"view reports"	Click the link to view link usage reports from the Reporting Server. A login screen should be shown: 

Important Note

The registration process will contact the reporting server to associate the Peplink Balance unit with the specified user account on the server.

Please ensure prior to registration that the user account that is entered is valid.

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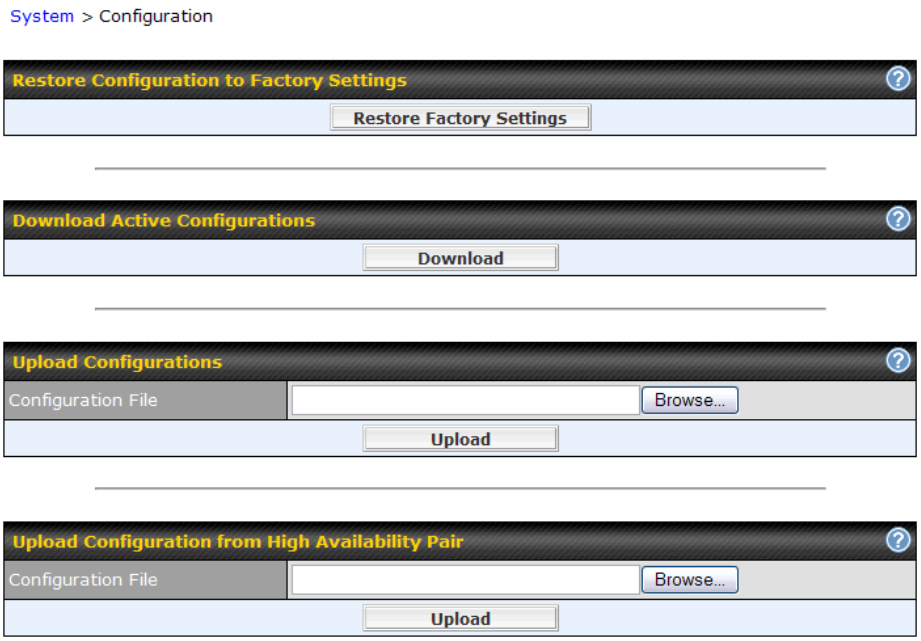
18.8 Saving and Loading Configurations

Backing up the Peplink Balance settings immediately after the successful completion of the initial setup is strongly recommended.

The functionality to download and upload Peplink Balance settings is found at the following location: ***System > Configuration***:



18.8.1 Restore Configuration to Factory Settings

The ***Restore Factory Settings*** button is to reset the configuration to the factory default settings. You have to click the Apply Changes button to make the settings effective.

18.8.2 Downloading Active Configurations

The ***Download*** button is to backup the current active settings. Click ***Download*** and save the configuration file.

18.8.3 Uploading Configurations

To restore or change settings based on a configuration file, click ***Browse*** to locate the configuration file on the local computer, and then click ***Upload***.

The new settings can then be applied by clicking the Apply Changes button on the page header, or discard at the Main page of Web Administration Interface.

18.8.4 Uploading Configuration from High Availability Pair

(This section applies only to Peplink Balance 200, 300, 380, 390, 700 and 710.)

In a High Availability (HA) configuration, to quickly load onto the Peplink Balance unit the configuration of its HA counterpart, click the ***Upload*** button.

After loading the settings, configure the LAN IP address of the Peplink Balance unit to be different from the HA counterpart.

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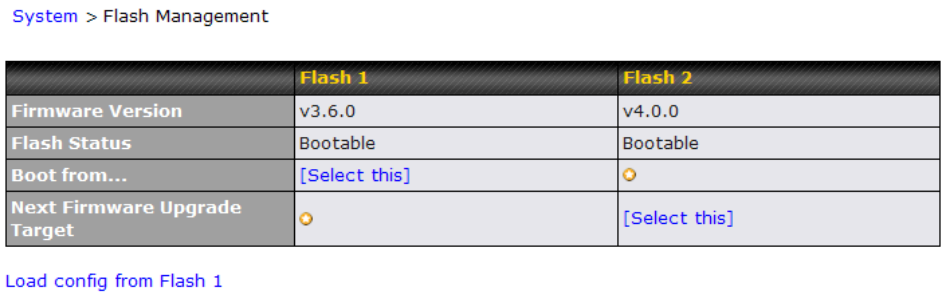
18.9 Flash Management

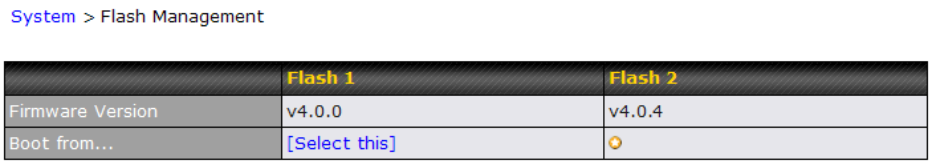
The Peplink Balance 20L, 30, 200 and 300 is equipped with dual flash memory modules. The Peplink Balance 380, 390, 700 and 710 has single module but with two partitions. Each flash memory or partition stores one firmware image. It not only allows improved flexibility but also facilitates more effective management of the flash contents. It is possible to upgrade the firmware on the module/partition that is not designated for booting, so that the boot flash is unaffected by firmware upgrade process or any potential power failures throughout.

Flash module management is located at ***System > Flash Management***:

For Peplink Balance 20L, 30, 200 and 300



For Peplink Balance 380, 390, 700 and 710:



Flash Management	
Firmware Version	This displays the firmware version on each flash module/partition (i.e. ***Flash 1*** or ***Flash 2***)
Flash Status	This shows the status of the flash module.
Boot from…	The star indicates the flash module/partition from which Peplink Balance will perform its next boot.
Next Firmware Upgrade Target	The star indicates the flash module that is the target of the next firmware upgrade. By default, the target of the next firmware upgrade is the flash module that is NOT designated for the next boot.

For Peplink Balance 20L, 30, 200 and 300, by clicking ***Load config from Flash X***, the configuration parameters on the corresponding flash module is loaded, but not applied. (***X*** corresponds to the flash module that is NOT designated for the next boot.) For example, clicking ***Load config from Flash 1*** loads the configuration from Flash 1, but does not apply the corresponding settings.

The configuration parameters are applied upon clicking ***Apply Changes*** on the page header of Web Administration Interface.

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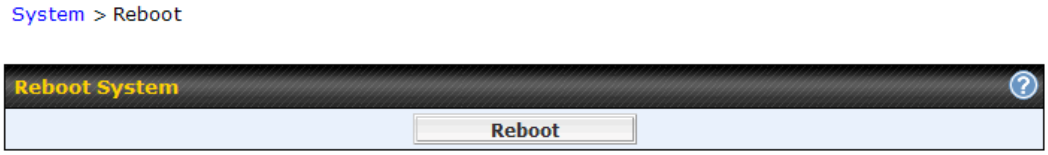
18.10 Reboot

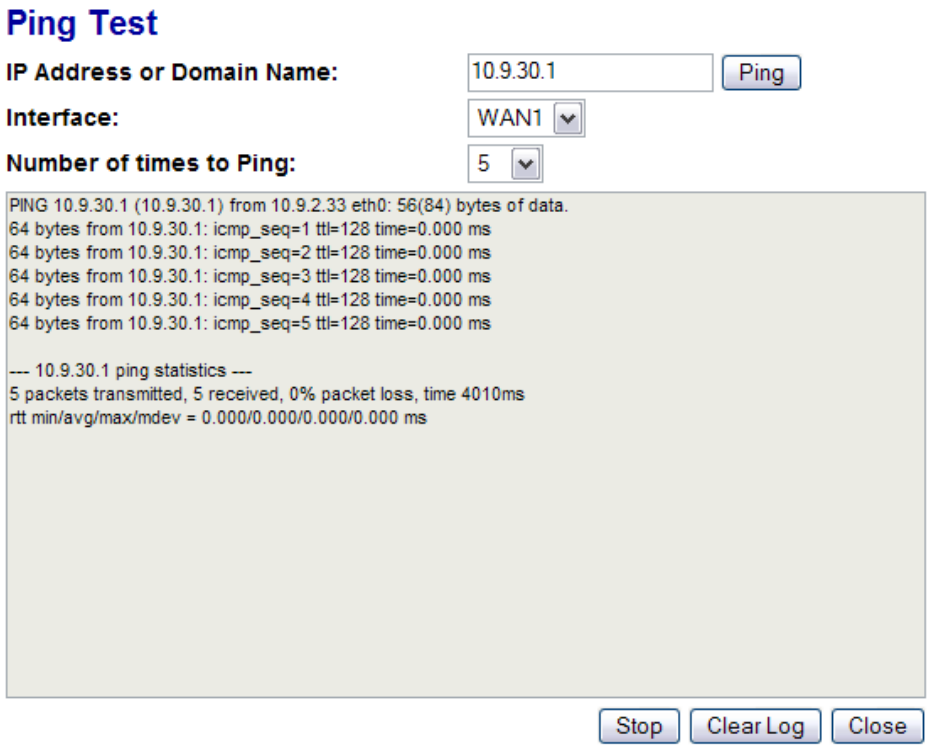
This page provides a Reboot button for restarting the system.



18.11 Ping Test

The Ping Test tool in Peplink Balance performs Pings through a specified Ethernet interface.

The Ping utility is located at ***System > Tools > Ping***. The Ping utility is displayed as a pop-up window, illustrated as follows:


Ping Test
IP Address or Domain Name:
10.9.30.1
Ping
Interface:
WAN1
Number of times to Ping:
5
PING 10.9.30.1 (10.9.30.1) from 10.9.2.33 eth0: 56(84) bytes of data.
64 bytes from 10.9.30.1: icmp_seq=1 ttl=128 time=0.000 ms
64 bytes from 10.9.30.1: icmp_seq=2 ttl=128 time=0.000 ms
64 bytes from 10.9.30.1: icmp_seq=3 ttl=128 time=0.000 ms
64 bytes from 10.9.30.1: icmp_seq=4 ttl=128 time=0.000 ms
64 bytes from 10.9.30.1: icmp_seq=5 ttl=128 time=0.000 ms
--- 10.9.30.1 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4010ms
rtt min/avg/max/mdev = 0.000/0.000/0.000/0.000 ms
Stop
Clear Log
Close

Tip
A System Administrator can use the Ping utility to manually check the connectivity of a particular LAN/WAN connection.

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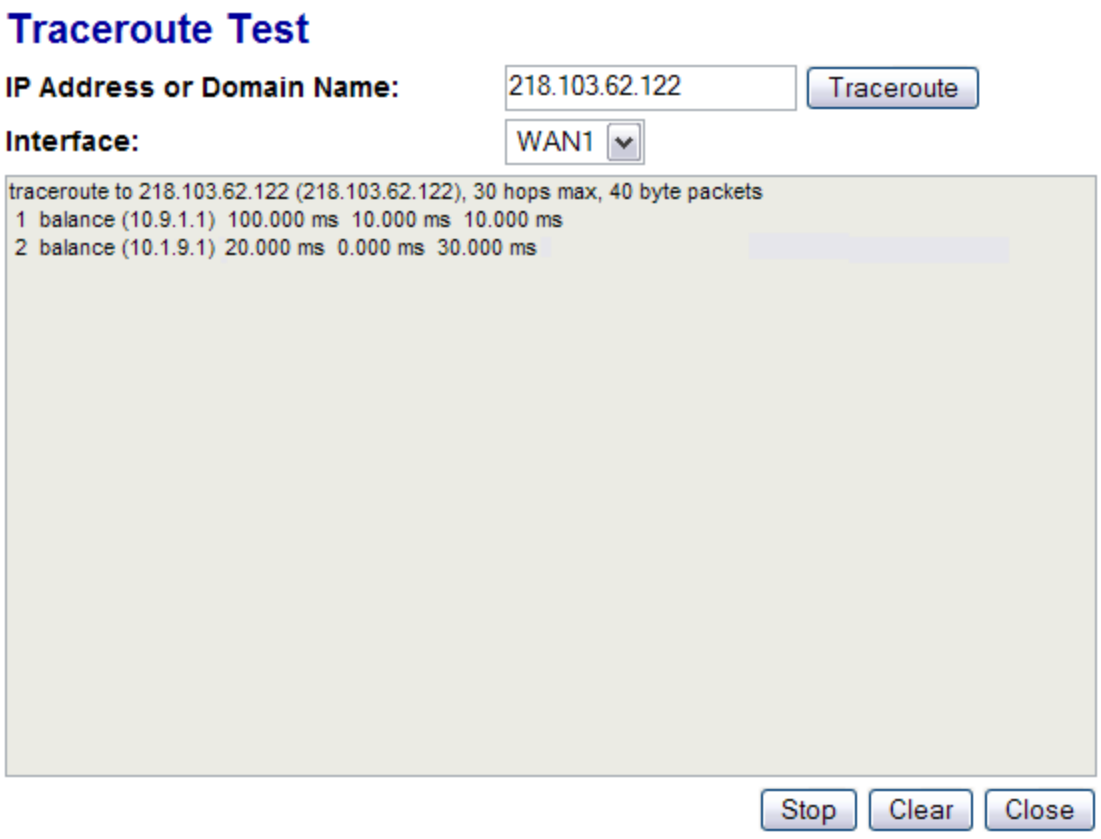
18.12 Traceroute Test

The Traceroute Test tool in Peplink Balance traces the routing path to the destination through a particular Ethernet interface.

The Traceroute Test utility is located at ***System > Tools > Traceroute***. The Traceroute Test utility is displayed as a pop-up window, illustrated as follows:



Tip
A System Administrator can use the Traceroute utility to analyze the connection path of a LAN/WAN connection.

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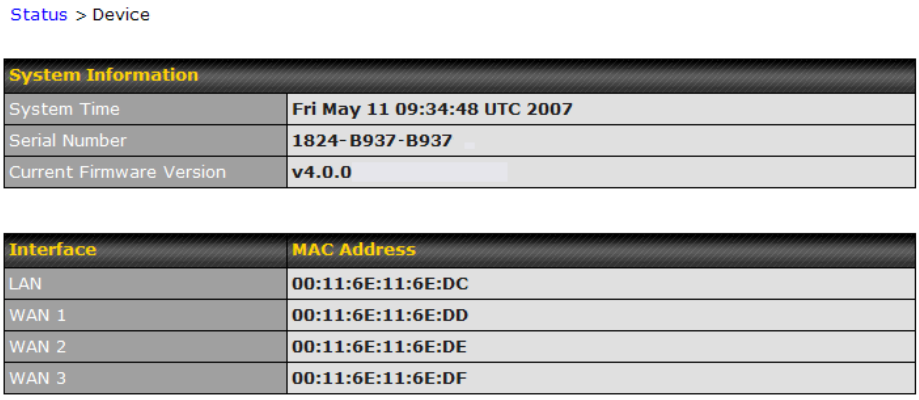
19 Status

The information section displays the information of Peplink Balance on the device, site-to-site VPN, link usage, active sessions, DHCP clients and log.

19.1 Device

System information is located at ***Status > Device***:



System Information	
System Time	This shows the current system time.
Serial Number	This shows the serial number of the Peplink Balance unit.
Current Firmware Version	This shows the firmware version on which the Peplink Balance unit is currently running.

The second table shows the MAC address of each Ethernet interface.

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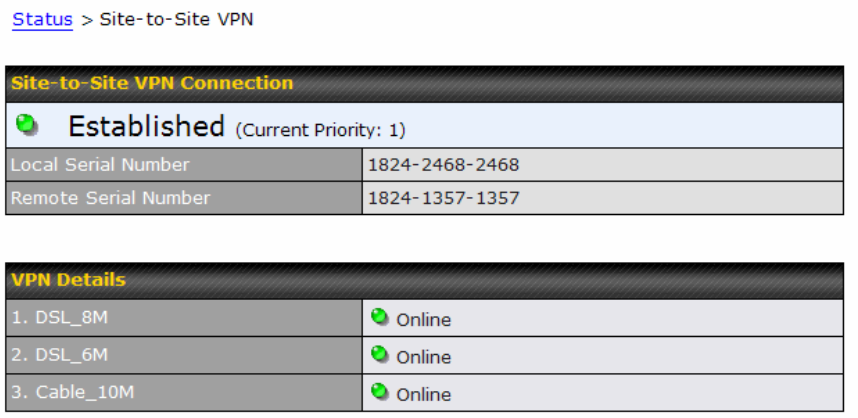
19.2 Site-to-Site VPN Status

(This section applies only to Peplink Balance 380, 390, 700 and 710.)

Site-to-Site VPN status information is located at ***Status > Site-to-Site VPN***:



This screen shows the current Site-to-Site VPN's connection status, local and remote device's serial number.

The VPN Details table shows which WAN connections are being used for routing VPN traffic.

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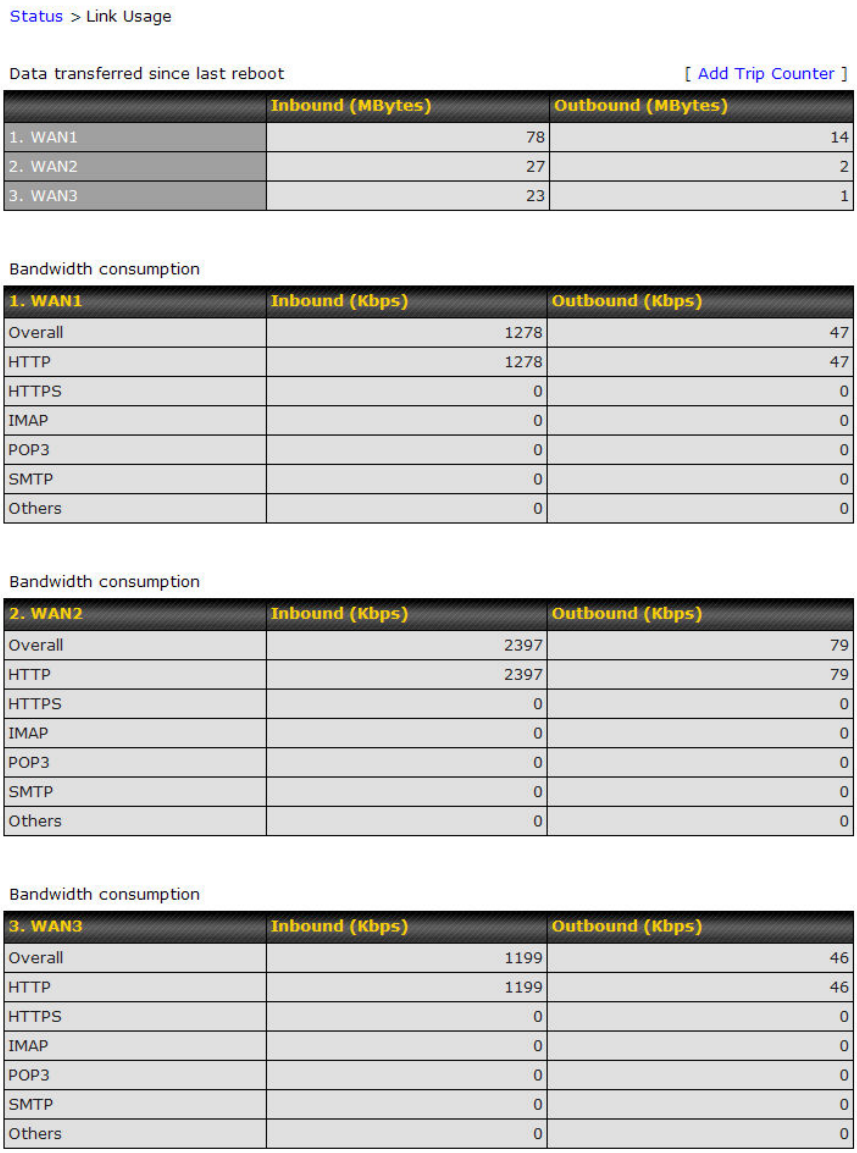
19.3 Link Usage Status

Link usage status information is located at ***Status > Link Usage***:



Status > Link Usage

Data transferred since last reboot [Add Trip Counter]

	Inbound (MBytes)	Outbound (MBytes)
1. WAN1	78	14
2. WAN2	27	2
3. WAN3	23	1

Bandwidth consumption

1. WAN1	Inbound (Kbps)	Outbound (Kbps)
Overall	1278	47
HTTP	1278	47
HTTPS	0	0
IMAP	0	0
POP3	0	0
SMTP	0	0
Others	0	0

Bandwidth consumption

2. WAN2	Inbound (Kbps)	Outbound (Kbps)
Overall	2397	79
HTTP	2397	79
HTTPS	0	0
IMAP	0	0
POP3	0	0
SMTP	0	0
Others	0	0

Bandwidth consumption

3. WAN3	Inbound (Kbps)	Outbound (Kbps)
Overall	1199	46
HTTP	1199	46
HTTPS	0	0
IMAP	0	0
POP3	0	0
SMTP	0	0
Others	0	0

The Link Usage Status section displays the cumulative amounts of data that have been transferred through each WAN connection, as well as the inbound and outbound rate of data transferred via various protocols.

If you click on the "Add Trip Counter" link, a new transfer volume table will be shown where the values are reset to zero. This will enable you to count the transferred volume from a specific time instead of from the system up time.

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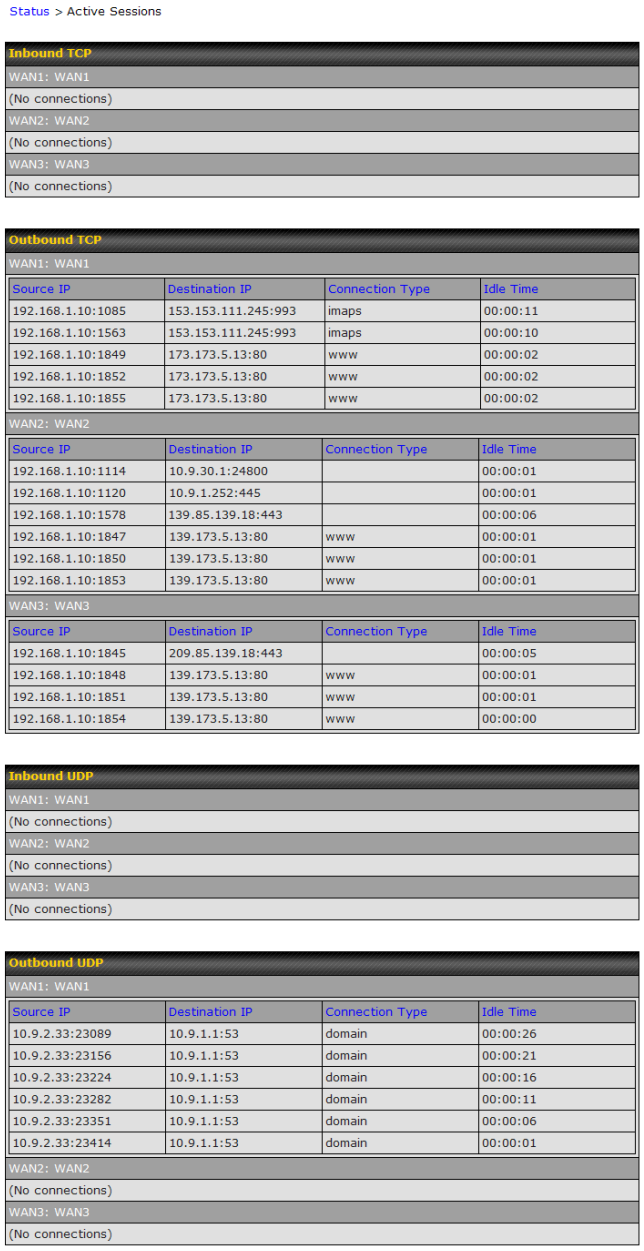
19.4 Active Sessions

Information on Active Sessions is at ***Status > Active Sessions***:



Status > Active Sessions

Inbound TCP

WAN1: WAN1

(No connections)

WAN2: WAN2

(No connections)

WAN3: WAN3

(No connections)

Outbound TCP

WAN1: WAN1

Source IP	Destination IP	Connection Type	Idle Time
192.168.1.10:1085	153.153.111.245:993	imaps	00:00:11
192.168.1.10:1563	153.153.111.245:993	imaps	00:00:10
192.168.1.10:1849	173.173.5.13:80	www	00:00:02
192.168.1.10:1852	173.173.5.13:80	www	00:00:02
192.168.1.10:1855	173.173.5.13:80	www	00:00:02

WAN2: WAN2

Source IP	Destination IP	Connection Type	Idle Time
192.168.1.10:1114	10.9.30.1:24800		00:00:01
192.168.1.10:1120	10.9.1.252:445		00:00:01
192.168.1.10:1578	139.85.139.18:443		00:00:06
192.168.1.10:1847	139.173.5.13:80	www	00:00:01
192.168.1.10:1850	139.173.5.13:80	www	00:00:01
192.168.1.10:1853	139.173.5.13:80	www	00:00:01

WAN3: WAN3

Source IP	Destination IP	Connection Type	Idle Time
192.168.1.10:1845	209.85.139.18:443		00:00:05
192.168.1.10:1848	139.173.5.13:80	www	00:00:01
192.168.1.10:1851	139.173.5.13:80	www	00:00:01
192.168.1.10:1854	139.173.5.13:80	www	00:00:00

Inbound UDP

WAN1: WAN1

(No connections)

WAN2: WAN2

(No connections)

WAN3: WAN3

(No connections)

Outbound UDP

WAN1: WAN1

Source IP	Destination IP	Connection Type	Idle Time
10.9.2.33:23089	10.9.1.1:53	domain	00:00:26
10.9.2.33:23156	10.9.1.1:53	domain	00:00:21
10.9.2.33:23224	10.9.1.1:53	domain	00:00:16
10.9.2.33:23282	10.9.1.1:53	domain	00:00:11
10.9.2.33:23351	10.9.1.1:53	domain	00:00:06
10.9.2.33:23414	10.9.1.1:53	domain	00:00:01

WAN2: WAN2

(No connections)

WAN3: WAN3

(No connections)

This Active Sessions section displays the active inbound and outbound, UDP and TCP sessions of each WAN connection on Peplink Balance.

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19.5 DHCP Clients

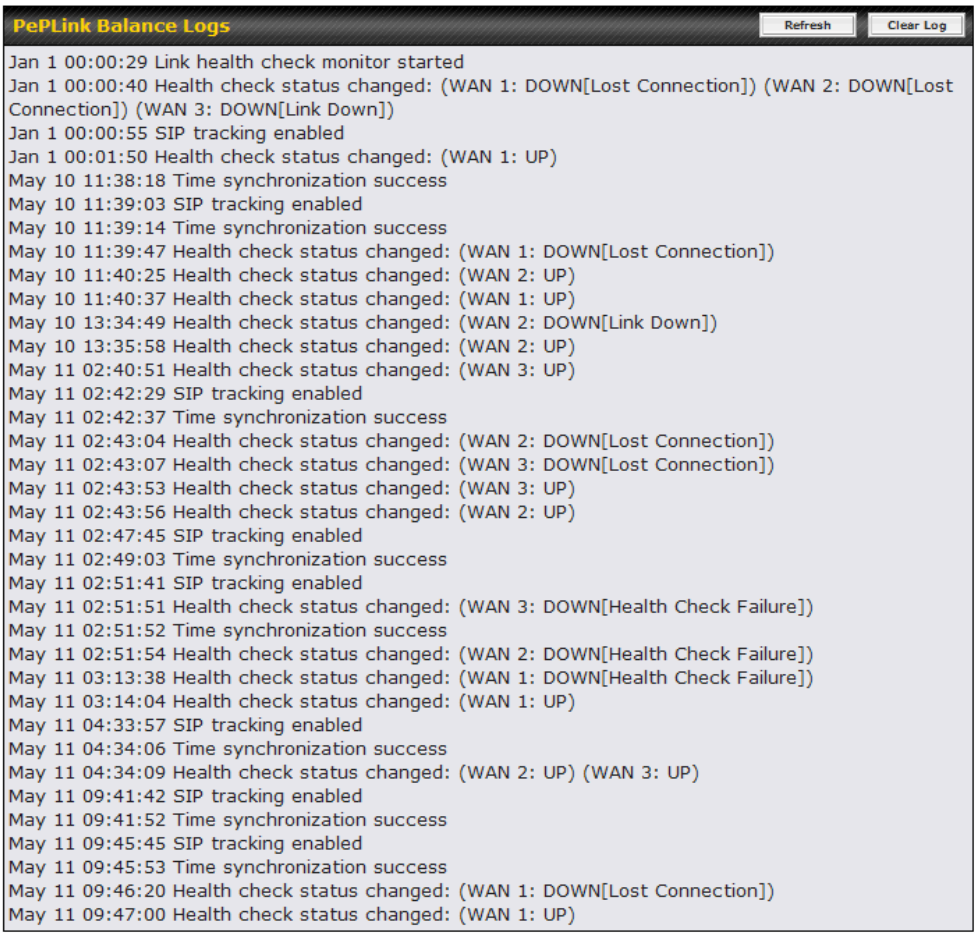
The ***DHCP Clients*** table is at ***Status > DHCP Clients***. It lists DHCP client IP addresses and MAC addresses that the Peplink Balance has offered IP addresses to since it is powered up.

Status > DHCP Clients

DHCP Clients	
IP Address	MAC Address
192.168.1.10	00:c8:19:29:c8:19

19.6 Log

Log information is located at ***Status > Logs***:


PePLink Balance Logs
Refresh
Clear Log
Jan 1 00:00:29 Link health check monitor started
Jan 1 00:00:40 Health check status changed: (WAN 1: DOWN[Lost Connection]) (WAN 2: DOWN[Lost Connection]) (WAN 3: DOWN[Link Down])
Jan 1 00:00:55 SIP tracking enabled
Jan 1 00:01:50 Health check status changed: (WAN 1: UP)
May 10 11:38:18 Time synchronization success
May 10 11:39:03 SIP tracking enabled
May 10 11:39:14 Time synchronization success
May 10 11:39:47 Health check status changed: (WAN 1: DOWN[Lost Connection])
May 10 11:40:25 Health check status changed: (WAN 2: UP)
May 10 11:40:37 Health check status changed: (WAN 1: UP)
May 10 13:34:49 Health check status changed: (WAN 2: DOWN[Link Down])
May 10 13:35:58 Health check status changed: (WAN 2: UP)
May 11 02:40:51 Health check status changed: (WAN 3: UP)
May 11 02:42:29 SIP tracking enabled
May 11 02:42:37 Time synchronization success
May 11 02:43:04 Health check status changed: (WAN 2: DOWN[Lost Connection])
May 11 02:43:07 Health check status changed: (WAN 3: DOWN[Lost Connection])
May 11 02:43:53 Health check status changed: (WAN 3: UP)
May 11 02:43:56 Health check status changed: (WAN 2: UP)
May 11 02:47:45 SIP tracking enabled
May 11 02:49:03 Time synchronization success
May 11 02:51:41 SIP tracking enabled
May 11 02:51:51 Health check status changed: (WAN 3: DOWN[Health Check Failure])
May 11 02:51:52 Time synchronization success
May 11 02:51:54 Health check status changed: (WAN 2: DOWN[Health Check Failure])
May 11 03:13:38 Health check status changed: (WAN 1: DOWN[Health Check Failure])
May 11 03:14:04 Health check status changed: (WAN 1: UP)
May 11 04:33:57 SIP tracking enabled
May 11 04:34:06 Time synchronization success
May 11 04:34:09 Health check status changed: (WAN 2: UP) (WAN 3: UP)
May 11 09:41:42 SIP tracking enabled
May 11 09:41:52 Time synchronization success
May 11 09:45:45 SIP tracking enabled
May 11 09:45:53 Time synchronization success
May 11 09:46:20 Health check status changed: (WAN 1: DOWN[Lost Connection])
May 11 09:47:00 Health check status changed: (WAN 1: UP)

The log section displays a list of events that has taken place on the Peplink Balance unit. Click the Refresh button to retrieve log entries again. Click the ***Clear Log*** button to clear log.

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Appendix A. Restoration of Factory Defaults

To restore the factory default settings on a Peplink Balance unit, perform the following:

For Balance 20L/30/200/300:

1. Locate the reset button at the back of the Peplink Balance unit.
2. With a paper clip, press and keep the reset button pressed for at least 10 seconds, until the unit reboots itself.

For Balance 380/390/700/710:

- Use the buttons to control the LCD menu to go to "Maintenance" → "Factory Default". Then choose "Yes" to confirm.

Afterwards, the factory default settings will be restored.

Important Note
All user settings will be lost after restoring the factory default settings. Regular backup of configuration parameters is strongly recommended.

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Appendix B. Routing under DHCP, Static IP, and PPPoE

The information in this appendix applies only to situations where Peplink Balance operates with to a WAN connection under DHCP, Static IP, and PPPoE.

For information that applies to GRE, please refer to:

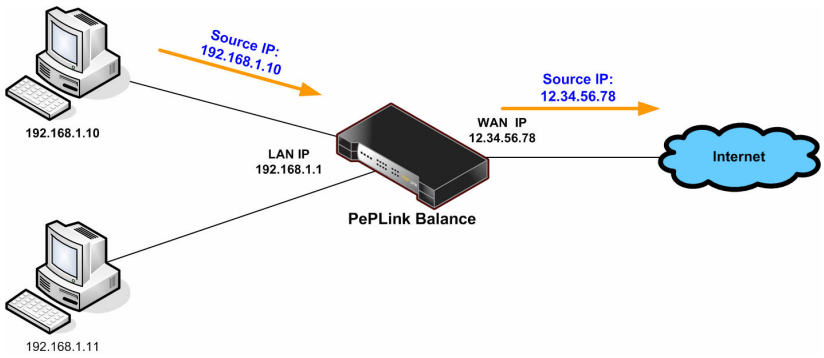
- Section 10.4.1, **Routing under GRE via Network Address Translation (NAT)**
- Section 10.4.2, **Routing under GRE via IP Forwarding**

B.1 Routing via Network Address Translation (NAT)

When Peplink Balance is operating under NAT mode, the source IP addresses of outgoing IP packets are translated to the WAN IP address of Peplink Balance. Therefore, with NAT, all LAN devices share the same WAN IP address to access the Internet (i.e. the WAN IP address of Peplink Balance).

Operating Peplink Balance in NAT mode requires only one WAN (Internet) IP address. In addition, operating in NAT mode also has security advantages because LAN devices are hidden behind Peplink Balance, not directly accessible from the Internet, and, hence, less vulnerable to attacks.

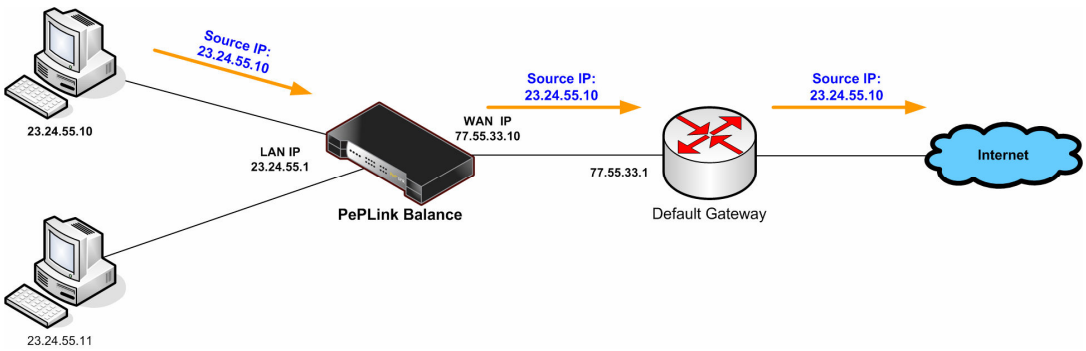
The following figure shows the packet flow in NAT mode:



B.2 Routing via IP Forwarding

When Peplink Balance is operating under IP Forwarding mode, the IP addresses of IP packets are unchanged; Peplink Balance forwards both inbound and outbound IP packets without changing their IP addresses.

The following figure shows the packet flow in IP Forwarding mode:



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Appendix C. Case Studies

C.1 Performance Optimization

C.1.1 Scenario

In this scenario, email and web browsing are the two main Internet services used by the LAN users.

The mail server is external to the network.

The connections are ADSL (with slow uplink and fast downlink) and Metro Ethernet (symmetric).

C.1.2 Solution

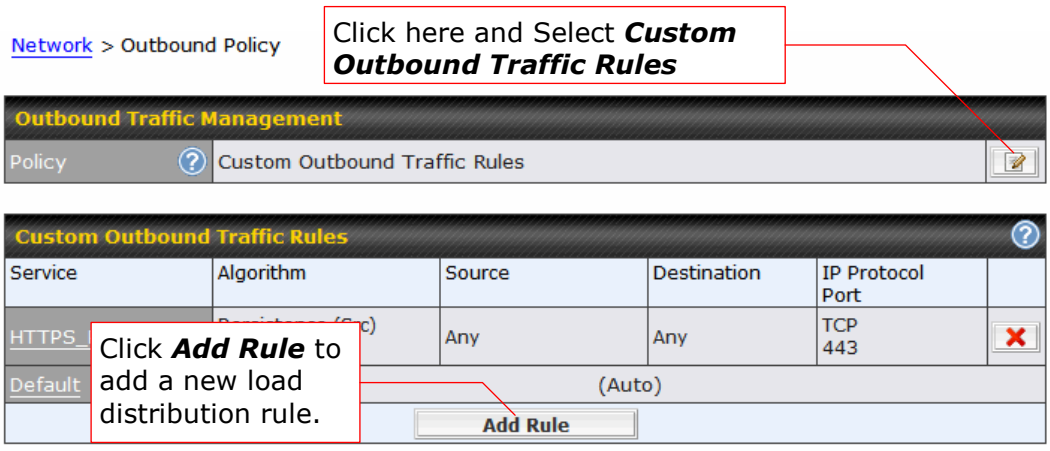
The solution is to individually set the WAN loading balance according to the service.

- Web browsing mainly downloads data; sending e-mails mainly consumes upload bandwidth.
- Both connections offer good download speeds; WAN2 offers good upload speeds.
- Define WAN1 and WAN2's inbound and outbound bandwidths to be 3M/512k and 4M/4M respectively.
- For HTTP, set the weight to 3 : 4.
- For SMTP, set the weight to 1 : 8, such that users will have a greater chance to be routed via WAN2 when sending e-mail.

C.1.3 Settings

1. Add a new outbound traffic rule for HTTP.
2. Add a new outbound traffic rule for SMTP.

In general, to add a new outbound traffic rule:



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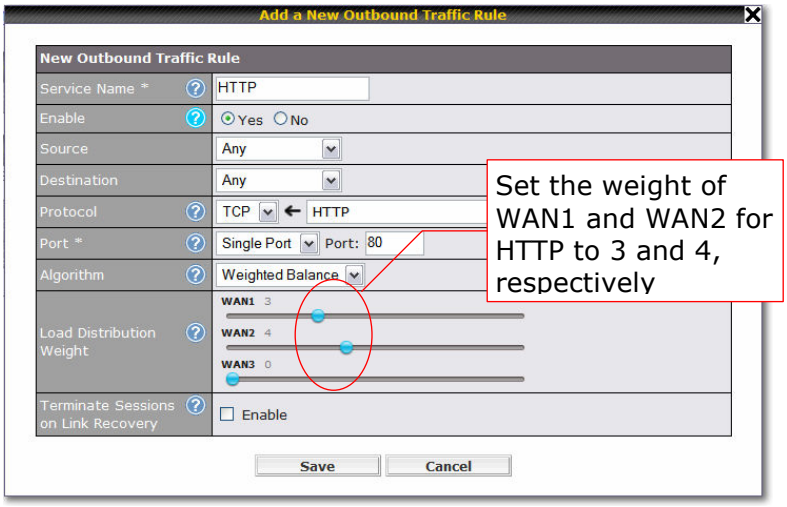
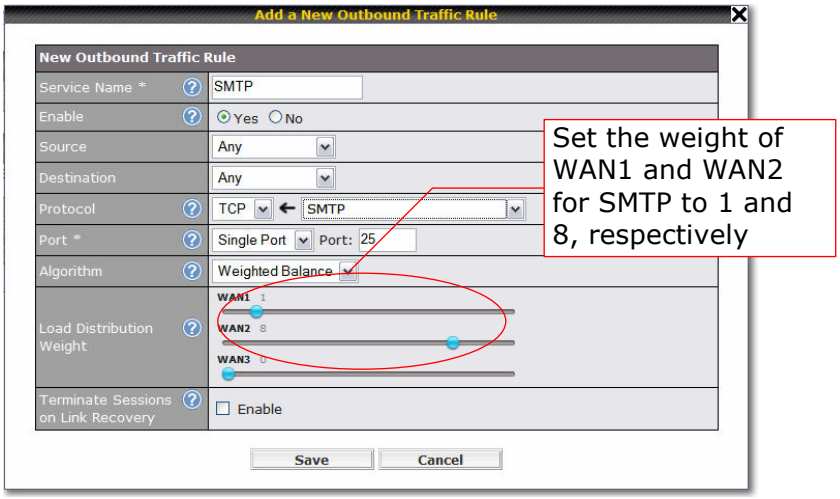
Settings for HTTP:



Settings for SMTP:



C.2 Maintaining the Same IP Address throughout a Session

C.2.1 Scenario

Some client IP address sensitive web sites (for example, Internet banking) use both client IP address and cookies matching for session identification. Since different IP addresses are used during the load balancing, the session is dropped when a mismatching IP is detected.

C.2.2 Solution

Make use of the Persistency functionality of Peplink Balance.

With Persistency configured and the option "By destination" selected, Peplink Balance uses a consistent WAN connection for source-destination pairs of IP addresses, and prevents sessions from being dropped.

With Persistency configured and the option "By source" selected, Peplink Balance uses a consistent WAN connection for same source IP addresses. This option offers even higher application compatibility but the outbound traffic load will be distributed more evenly only if more users use the Internet.

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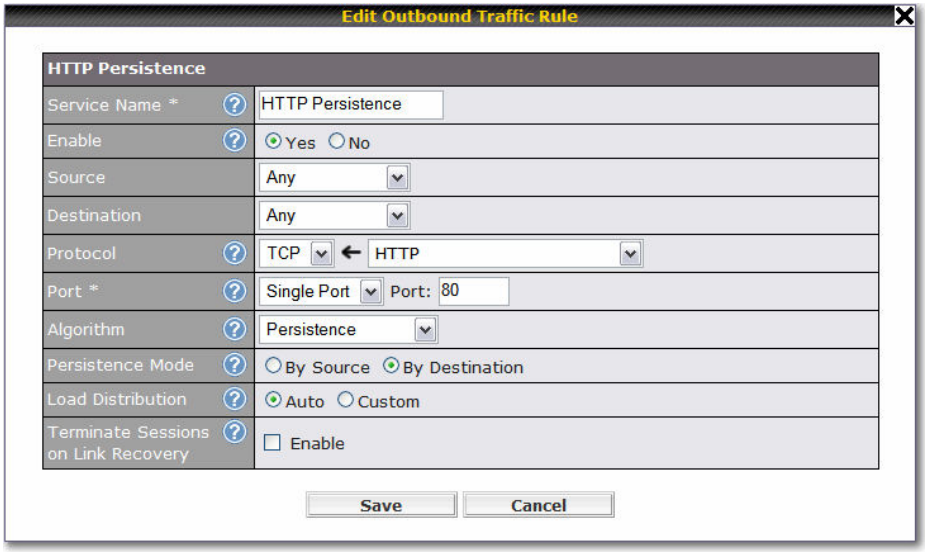
C.2.3 Settings

Set persistence in:

Network > Outbound Traffic Management > Custom Outbound Traffic Rules

Click ***Add Rule***, select ***HTTP*** (TCP port 80) for web service, and select ***Persistence***.



Tip

A network administrator can use the Traceroute utility to manually analyze the connection path of a particular WAN connection.

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C.3 Bypassing the Firewall to Access Hosts on LAN

C.3.1 Scenario

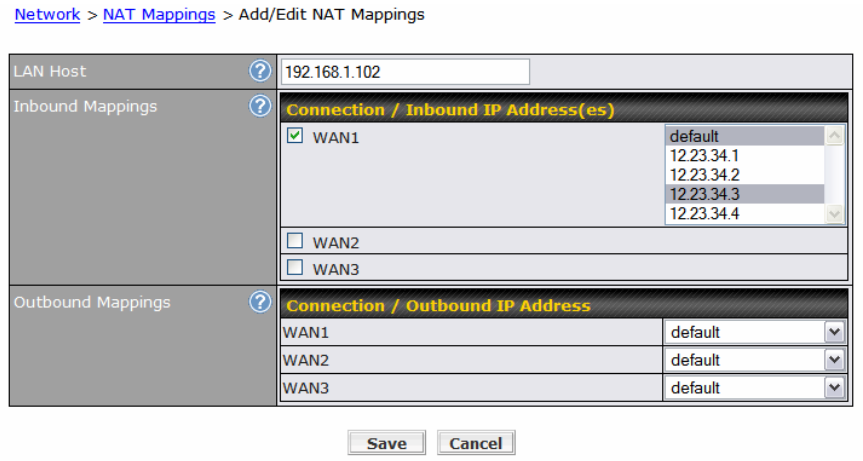
There are times when remote access to computers on the LAN is desirable; for example, when hosting web sites, online businesses and FTP download and upload areas, etc.

In such cases, it may be appropriate to create an inbound NAT mapping for the network to allow some hosts on the LAN to be accessible from outside of the firewall.

C.3.2 Solution

Web Administration Interface can be used for adding an inbound NAT mapping to a host and to bind the host to the WAN connections, via ***Network > NAT Mappings > Add NAT Rule***

For example, the following settings add the host, with IP address 192.168.1.102, to an Inbound Mapping and bind the host to the default IP and 12.23.34.3 of WAN1:



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C.4 Inbound Access Restriction

C.4.1 Scenario

A firewall is required in order to protect the network from potential hacker attacks and other Internet security threats.

C.4.2 Solution

Firewall functionality is built into Peplink Balance. By default, inbound access is unrestricted.

Enabling a basic level of protection involves setting up firewall rules.

For example, to set up a firewall rule between the Internet and the private network that monitors Web access from Internet, click the "Add Rule" button in the "Inbound Firewall Rules" table, make the settings according the following screenshot:

After the fields have been entered as in the screenshot, click ***Save*** to add the rule.

Then change the default inbound rule to "Deny" by clicking the "Default" rule in the "Inbound Firewall Rules" table.

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C.5 Inbound Access Restriction

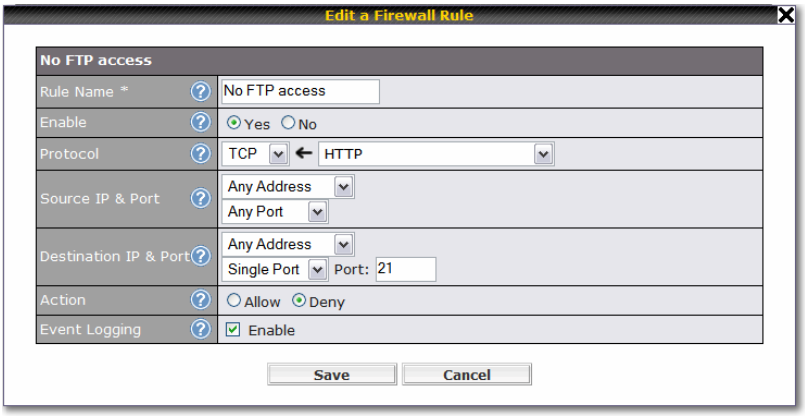
C.5.1 Scenario

For security reasons, it may be appropriate to disallow LAN users to use ftp to transfer files to and from the Internet, or otherwise restrict outbound access.

This can easily be achieved by setting up an outbound firewall rule with Peplink Balance.

C.5.2 Solution

To set up a firewall between Internet and private network for outbound access, click the "Add Rule" button in the "Outbound Firewall Rules" table, and then make the settings according the following screenshot:



After the fields have been entered as in the screenshot, click ***Save*** to add the rule.

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Appendix D. Troubleshooting

Problem 1

Outbound load is only distributed taking place over one WAN connection.

Solution

Outbound load can only be distributed evenly to the WAN connection if many outbound connections are made. If there is only one user on the LAN and only one download session is made from his/her browser, the WAN connections cannot be fully utilized.

For a single user, download manager applications are recommended. The applications can split a file into pieces and download the pieces simultaneously. For example: FlashGet (Windows), GetRight (Windows), iGetter (MAC), etc.

Problem 2

I am using FlashGet now. Why is the download speed still in single link's speed?

Solution

First, check whether the WAN connections are up.

Second, ensure your download manager application has split the file into 3 parts or more.

It is also possible that all of 2 or even 3 download sessions were being distributed to the same link by chance.

Problem 3

I am using some web sites to lookup my public IP address, e.g. www.whatismyip.com. When I keep pressing the browser's Refresh button, the server almost always returns the same address. The IP address supposed to be changing for every refresh

Solution

The web server has enabled the "Keep Alive" function such that you were using the same TCP session to query the server.

Try to test with a web site that does not enable "Keep Alive".

For example, try `http://private.dnsstuff.com/tools/aboutyou.ch` (This third-party web site is provided only for reference. Peplink has no association with the site and does not guarantee the site's validity or availability.)

Problem 4

What can I do if I suspect a problem on my LAN connection?

Solution

You can test the LAN connection using "ping".

For example, if you are using DOS/Windows, at the Command Prompt, type:

```
ping 192.168.1.1
```

This pings the Peplink Balance device (provided that Peplink Balance device's IP is 192.168.1.1) to test whether the connection to Peplink Balance is OK.

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Problem 5

What can I do if I suspect a problem on my Internet/WAN connection?

Solution

You can test the WAN connection by "ping", which is similar to problem 4.

As we want to isolate the problems from the LAN, "ping" will be performed from Peplink Balance. By using the ***Ping***/***Traceroute*** under the tab ***Status*** of the Peplink Balance, you may able to find out the source of problem.

Problem 6

When I upload files to a server via ftp, the transfer stalls after a few kilobytes of data are sent. What should I do?

Solution

The Maximum Transmission Unit (MTU) or MSS setting may need to be adjusted.

By default, the MTU is set at 1440. Choose "Auto" for all of your WAN connections. If it does not solve, you may try the MTU 1492 if a connection is a DSL. If problem still persists, change the size to smaller values until your problem is resolved (e.g. 1462, 1440, 1420, 1400, etc).

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Appendix E. Product Specifications

E.1 Peplink Balance 20L and 200

Routing

- NAT, Drop-in and IP Forwarding (Drop-in mode is not applicable to Balance 20L)
- Configurable Static Routes

WAN Support

- DHCP, PPPoE, GRE, and Static IP
- Inbound and Outbound Link Load Balance

Device Management

- Wizard & Menu Driven Web-based Administration Interface over HTML SSL
- Remote Reporting and Management
- Configurations Upload and Download

Security

- Compatible with IPsec and PPTP VPN
- Rules-based Stateful Firewall, with IP Address, Protocol and Port filtering
- NAT Mapping / One-to-One mapping

Physical Interface

- Two RJ-45 for an IEEE 802.3u 10/100M WAN
- Four RJ-45 for an IEEE 802.3u 10/100M LAN
- RS-232 Console / Serial (modem / TA) Port

Power Specification

- AC Power Adapter: 100-240V

Operating Environment

- Kensington Lock Interface
- Temperature: 0°C - 50°C (32°F – 122°F)
- Humidity: 10% - 90% (non-condensing)

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E.2 Peplink Balance 30 and 300

Routing

- NAT, Drop-in and IP Forwarding
- Configurable Static Routes

WAN Support

- DHCP, PPPoE, GRE, and Static IP
- Inbound and Outbound Link Load Balance

Device Management

- Wizard & Menu Driven Web-based Administration Interface over HTML SSL
- Remote Reporting and Management
- Configurations Upload and Download

Security

- Compatible with IPsec and PPTP VPN
- Rules-based Stateful Firewall, with IP Address, Protocol, and Port filtering
- NAT Mapping / One-to-One mapping

Physical Interface

- Three RJ-45 for an IEEE 802.3u 10/100M WAN
- Four RJ-45 for an IEEE 802.3u 10/100M LAN
- RS-232 Console / Serial (modem / TA) Port

Power Specification

- AC Power Adapter: 100-240V

Operating Environment

- Kensington Lock Interface
- Temperature: 0°C - 50°C (32°F – 122°F)
- Humidity: 10% - 90% (non-condensing)

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E.3 Peplink Balance 380 and 390

Routing

- NAT, Drop-in and IP Forwarding
- Configurable Static Routes

WAN Support

- DHCP, PPPoE, GRE, and Static IP
- Inbound and Outbound Link Load Balance

Device Management

- Wizard & Menu Driven Web-based Administration Interface over HTML SSL
- Remote Reporting and Management
- Configurations Upload and Download

Security

- Compatible with IPsec and PPTP VPN
- Rules-based Stateful Firewall, with IP Address, Protocol, and Port filtering
- NAT Mapping / One-to-One mapping

Physical Interface (Balance 380)

- Three RJ-45 for an IEEE 802.3u 10/100M WAN
- One RJ-45 for an IEEE 802.3u 10/100M LAN
- RS-232 Console / Serial (modem / TA) Port

Physical Interface (Balance 390)

- Three RJ-45 for an IEEE 802.3ab 10/100M/1000M WAN
- One RJ-45 for an IEEE 802.3ab 10/100M/1000M LAN
- RS-232 Console / Serial (modem / TA) Port

Power Specification

- AC Power Adapter: 100-240V

Operating Environment

- Temperature: 0°C - 40°C (32°F to 104°F)
- Humidity: 10% - 90% (non-condensing)

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E.4 Peplink Balance 700 and 710

Routing

- NAT, Drop-in and IP Forwarding
- Configurable Static Routes

WAN Support

- DHCP, PPPoE, GRE, and Static IP
- Inbound and Outbound Link Load Balance

Device Management

- Wizard & Menu Driven Web-based Administration Interface over HTML SSL
- Remote Reporting and Management
- Configurations Upload and Download

Security

- Compatible with IPsec and PPTP VPN
- Rules-based Stateful Firewall, with IP Address, Protocol, and Port filtering
- NAT Mapping / One-to-One mapping

Physical Interface

- Four RJ-45 for an IEEE 802.3u 10/100M WAN
- Three RJ-45 for an IEEE 802.3ab 10/100/1000M WAN
- One RJ-45 for an IEEE 802.3ab 10/100/1000M LAN
- RS-232 Console / Serial (modem / TA) Port

Power Specification

- AC Power Adapter: 100-240V

Operating Environment

- Temperature: 0°C - 40°C (32°F to 104°F)
- Humidity: 10% - 90% (non-condensing)

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www.peplink.com

Contact Us:

Sales
sales@peplink.com

Support
support@peplink.com

Business Development and Partnerships
partners@peplink.com

Address:

United States Office
800 West El Camino Real,
Mountain View
CA 94040
United States
Tel: +1 (650) 450 9668
Fax: +1 (650) 625 4664

Hong Kong Office
17/F, Park Building,
476 Castle Peak Road
Cheung Sha Wan
Hong Kong
Tel: +852 2990 7600
Fax: +852 3007 0588

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